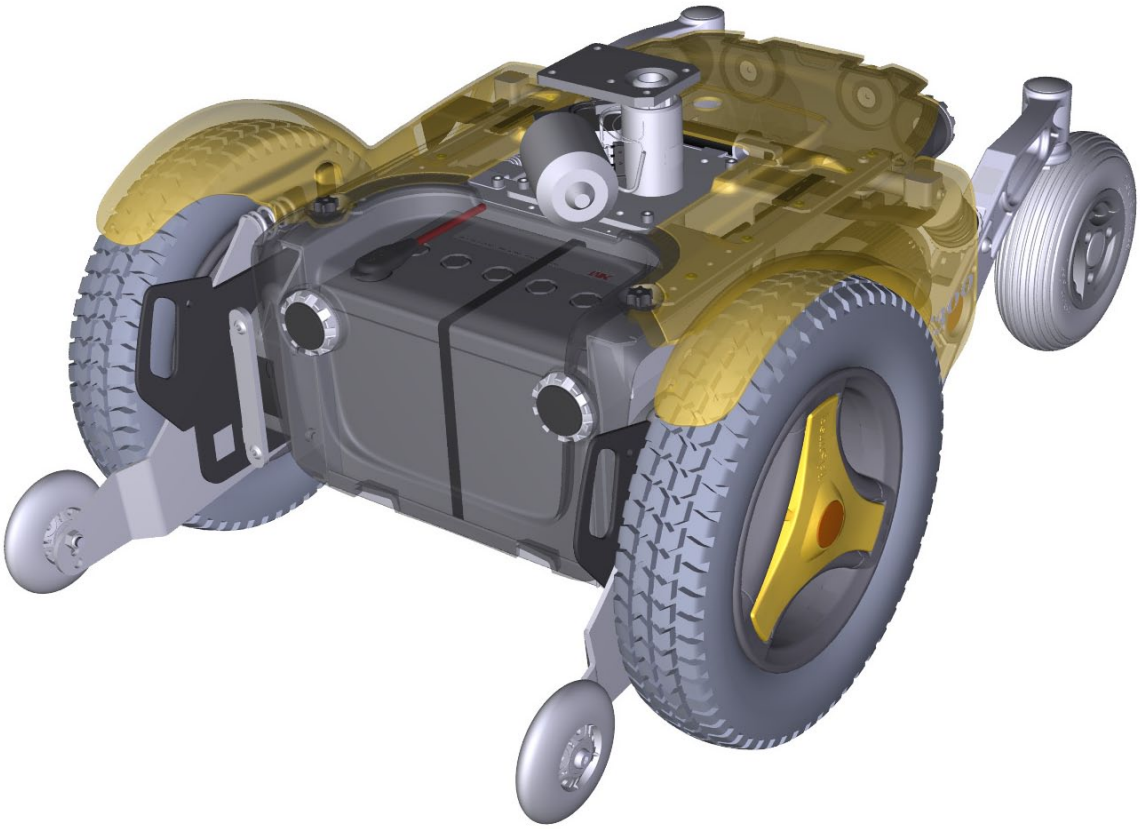
SERVICEMANUAL

US

Permobil K/C300/C300s

Power Wheelchair



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Introduction

The Service Manual is intended for technical personnel who maintain and repair power wheelchairs. It is important that anyone who performs maintenance and repairs described in this manual reads and understands the content of this manual so that the work is performed professionally. Always state the chassis number when contacting Permobil to ensure that the correct information is provided.

Technical Support

In the event of technical problems, you should contact Permobil BV.

Always state the seats serial number when contacting Permobil to ensure that the correct information is provided.

Spare parts and Accessories

Spare parts and accessories must be ordered through Permobil BV.

Warranties

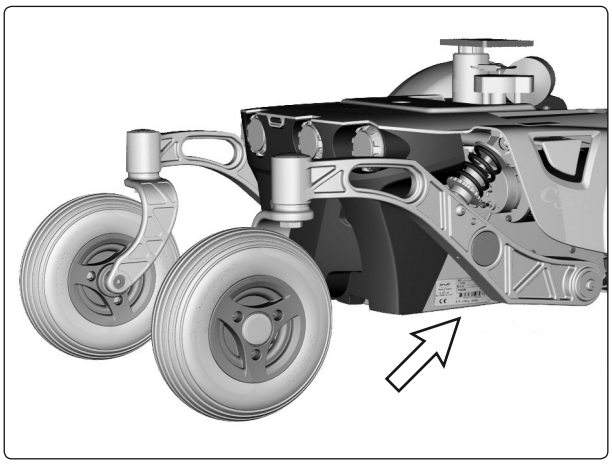
Batteries and charger are supplied with a one-year warranty

Maintenance

See the information in the Owner's Manual.

Identification plates

Chassis



Identification plate on chassis.

Rnet output stage

Identification plate on Rnet output stage.

Rnet control panel

Identification plate on Rnet control panel.

Identification plates

VR2 output stage

Identification plate on VR2 output stage

VR2 control panel

Identification plate on VR2 control panel.

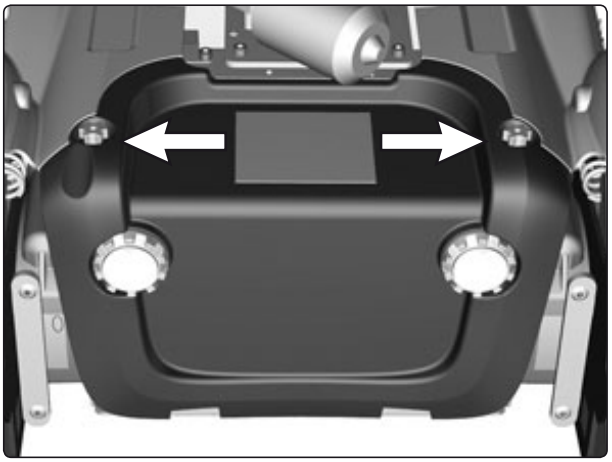
VR2 lights module

Identification plate on VR2 lights module.

Covers

Removing the front chassis cover

1. Move/fold the leg rests out.
2. Switch off the main power switch on the control panel.
3. Remove the two knobs that hold the cover in place (see fig.).
4. Lift the lower edge of the cover upwards/ forwards. Note that the cover is mounted partially inside the chassis at the lower edge.



The front and upper chassis cover is fitted with two knobs.

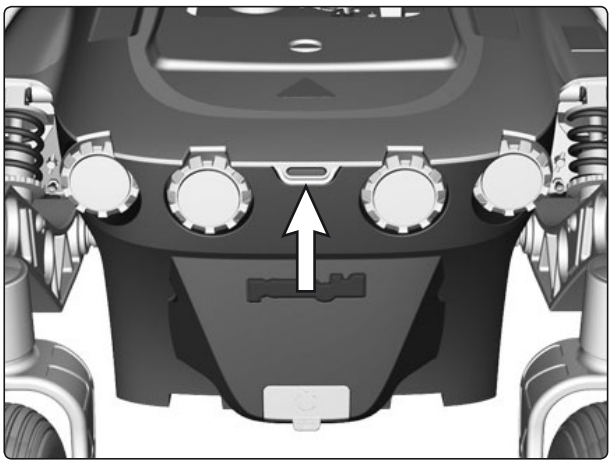
Assembly

Assemble in the reverse order.

1. Fit the cover partially inside the chassis at the lower edge (see fig.).
2. Fit the two knobs that hold the cover in place (see fig.).

Removing the rear chassis cover

1. Switch off the main power switch on the control panel.
2. If the upper chassis cover isn't removed, remove it's fastening knobs and lift it's rear end to release the rear chassis cover, raise the seat if needed. Remove the rear chassis cover by lifting it upwards/backwards..



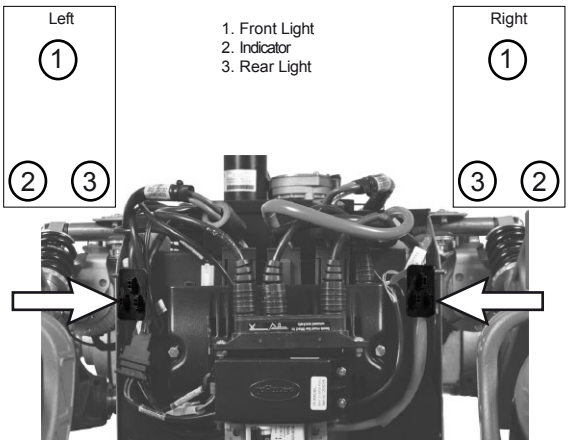
The rear cover is fitted with the upper chassis cover.

3. On wheelchairs equipped with lights, disconnect the rear lights cabling (see fig.).

Assembly

Assemble in the reverse order.

1. On wheelchairs equipped with lights, reconnect the rear lights cabling (see fig.).
2. Fit the cover partially inside the chassis at the lower edge (see fig. above).
3. Make sure the upper cover holds the rear cover and refit the two knobs (see fig. above).



Lights and indicator cabling connections.

Covers

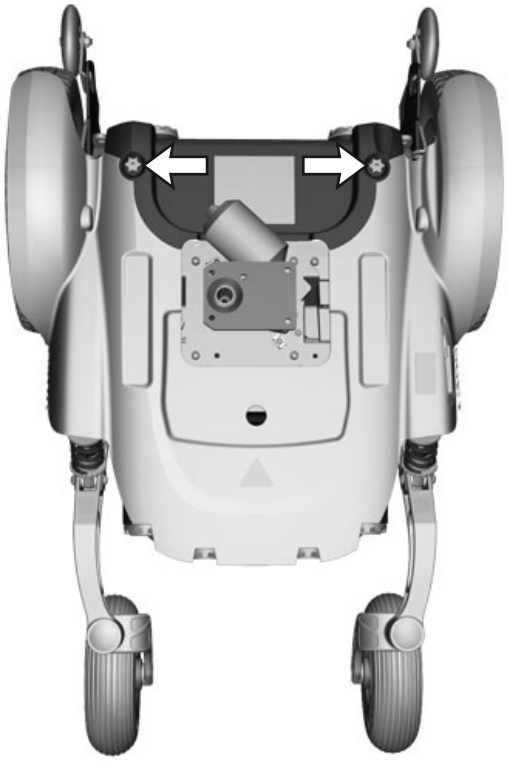
Removing the upper chassis cover

The cover is fitted with two knobs (see fig.).

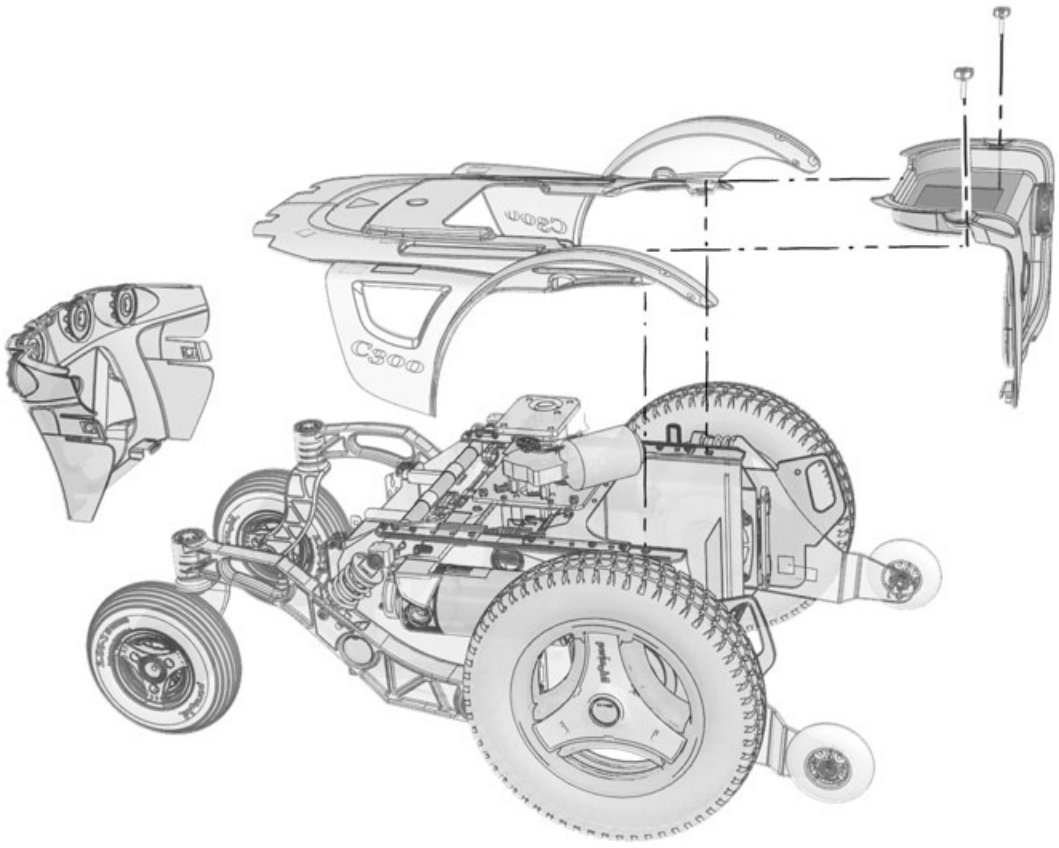
1. Move/fold the leg rests out and, if necessary, raise the seat.
2. Switch off the main power switch on the control panel.
3. If fitted, remove the front cover. See page 8.
5. Remove the cover by pulling/lifting it backwards.

Fitting the upper chassis cover

1. Move/fold the leg rests out and, if necessary, raise the seat.
2. Switch off the main power switch on the control panel.
3. Fit the rear chassis cover before the upper chassis cover is fitted (see page 8).
4. Fit the front and upper chassis cover with the two knobs (see fig. below.).



The upprer cover is fitted with four knobs.



Chassis covers.

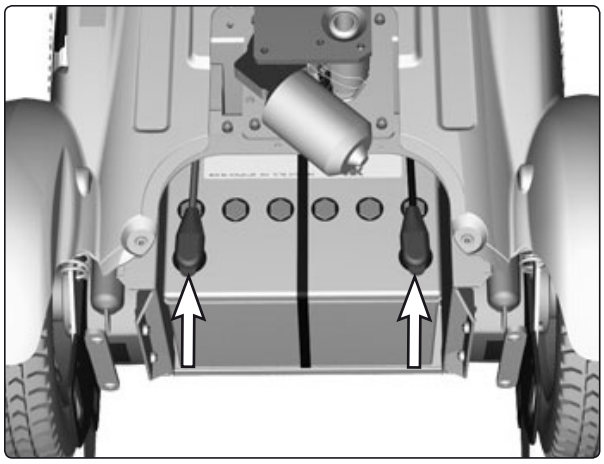
Batteries

WARNING

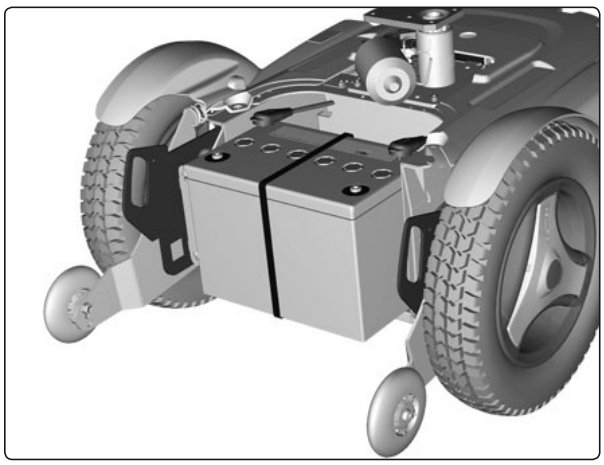
Be careful when using metal objects when working with batteries. A short-circuit can easily cause an explosion. Always use safety gloves and safety goggles.

Removing the Front Battery

1. Place the wheelchair on a level surface.
2. Move/fold the leg rests out, and if possible, raise the seat lift
3. Switch off the main power switch on the control panel.
4. Remove the front battery cover. See page 8.
5. Disconnect the battery connections. See fig. See also the sticker on the front chassis cover.
6. Lift/pull the battery out of the chassis using the battery belt.



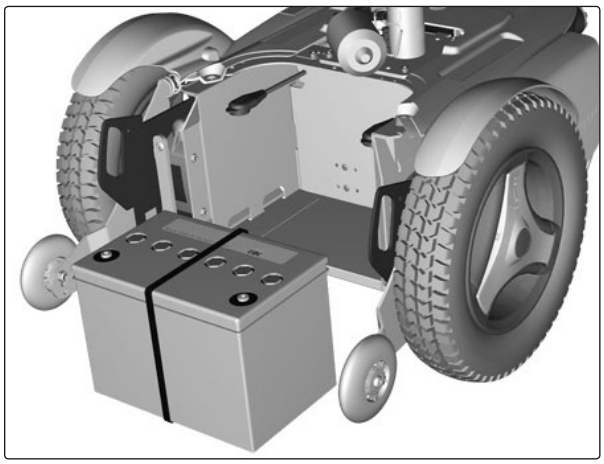
Battery connections.



Lift/pull the battery out of the chassis.

Fitting

1. Lift a new battery into the chassis using the battery belt. Leave the battery belt on the battery. Place the battery with the battery terminals at the front.
2. Connect the battery connections on the new battery. See also the sticker on the front chassis cover.
3. Refit the battery cover. See page 8.



Front battery removed.

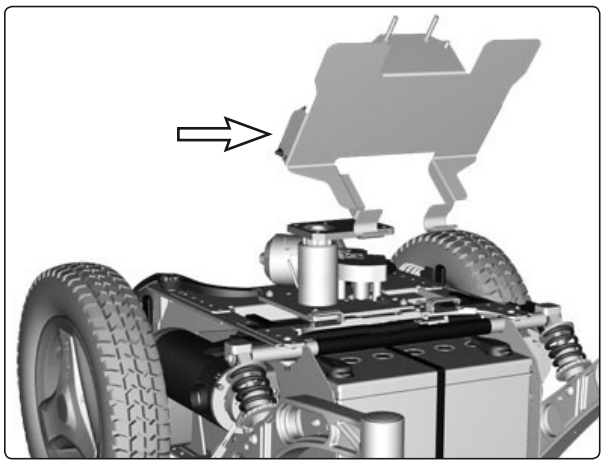
WARNING

Be careful when using metal objects when working with batteries. A short-circuit can easily cause an explosion. Always use safety gloves and safety goggles.

Batteries

Removing the Rear Battery

1. Place the wheelchair on a level surface.
2. Switch off the main power switch on the control panel.
3. Remove the upper and rear chassis covers. See pages 8-9.
4. Remove the output stage's mounting plate by lifting it straight up and then turning it so that the output stage's cabling faces downwards. See Figure.

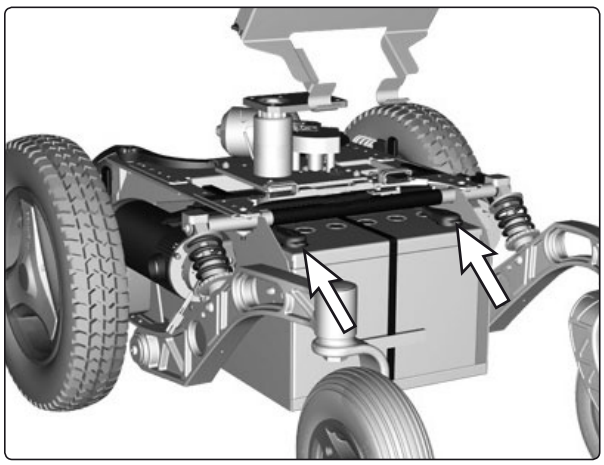


Remove the output stage's mounting plate by lifting it straight up.

5. Disconnect the battery connections. See also the sticker on the upper chassis cover.

⚠ WARNING

Be careful when using metal objects when working with batteries. A short-circuit can easily cause an explosion. Always use safety gloves and safety goggles.

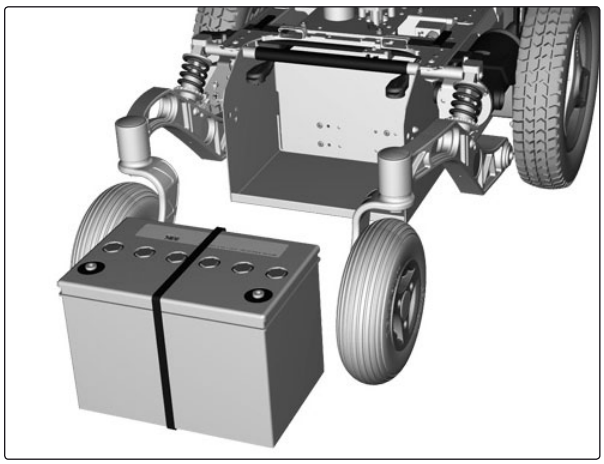


Battery connections.

6. Lift/pull the battery out of the chassis using the battery belt.

Installation

1. Lift a new battery into the chassis using the battery belt. Leave the battery belt on the battery. Place the battery with the battery terminals at the rear.
2. Connect the battery connections on the new battery. See also the sticker on the upper chassis cover.
3. Refit the output stage's mounting plate and the chassis covers.



Rear battery removed.

Drive wheels

For this task the following tools are necessary:
1 Allen key 6 mm.

Removal

1. Switch off the main power switch on the control panel.
2. Lift up and chock up the wheelchair chassis so that the wheel in question is free of the ground.
3. Remove the hub cap (1) by pulling it straight out. If necessary, carefully lever it out using a screwdriver in the slot on the cap.
4. Remove the four screws (2) that hold the wheel in place.

⚠ WARNING!

The central screw must not be removed.

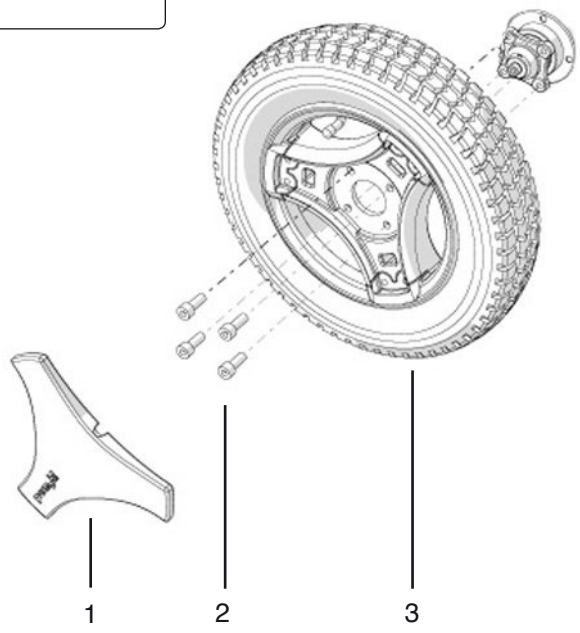
5. Remove the wheel by pulling it straight out.

Assembly

Assemble in the reverse order.

1. Fit the wheel with the four screws (2). Tighten the four screws using a torque wrench. **Tightening torque 24Nm**
2. Align the hubcap on the rim and fit it by pushing it straight in.

Pos.	Description
1	Hub cap
2	Screw, ISO 4762 M8x20 8.8 Fe/Zn 5 C1
3	Wheel



Fitting/removing the Drive wheels.

Drive wheels

For this task the following tools are necessary:
1 Allen key 6 mm.

Taking the rim apart

The rim can be taken apart to make it possible to fit/remove solid or pneumatic tires.

1. Remove the wheel in question from the wheelchair. See the previous page.
2. If the tire is pneumatic, release the air.

⚠ WARNING!

Ensure that pneumatic tires are not pressurized before the rim is taken apart, otherwise there is a risk of personal injury.

3. Remove the six screws holding the two halves of the rim together (see illustration).
4. Take the rim apart.

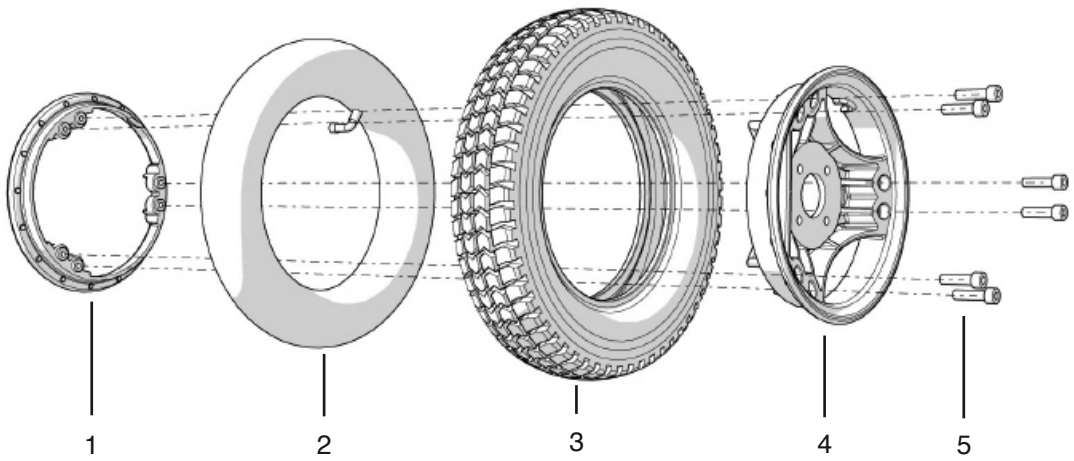
Assembly

Assemble in the reverse order.

1. Fit the two rim halves (1&4) together with tire (3) and if pneumatic tire is used, it's inner tube (2). Tighten the six screws using a torque wrench.
   Tightening torque: 22Nm
2. On wheels with pneumatic tires, fill the tire to recommended tire pressure, 200 kPa (2 bar).
3. Fit the wheel on to the wheelchair. See previous page.

⚠ WARNING!

The recommended tire pressure for pneumatic tires is 200 kPa (2 bar). Overfilling entails a risk of explosion.
Incorrect tire pressure may result in lower stability and maneuverability. Check regularly that the tires have the correct pressure.



Pos.	Description
1	Rim, outer section
2	Inner tube
3	Tire
4	Rim, outer section
5	Screw, ISO 4762 M8x30 8.8 Fe/Zn

Fitting a tire to a split rim.

Pivot wheels

For this task the following tools are necessary:
1 Allen key 6 mm.

Removal

1. Switch off the main power switch on the control panel.
2. Lift up and chock up the wheelchair chassis so that the wheel in question is free of the ground.
3. Remove the hub cap (4) (see fig. below).
4. Remove the screw (3) and washer (2) (see fig. below).
5. Remove the wheel (1) by pulling it of the axle (see fig. below).

Assembly

Assemble in the reverse order.

1. Check that the axle and rim is not damaged. If necessary, clean to remove dirt and rust. Replace damaged parts.
2. Fit the wheel on the axle using just your hands. Check that the wheel is fully located on the axle.
3. Fit the washer (2) on to the screw (3).
4. Fit the screw (3) and washer (2) on to the axle. Tighten the screw with a torque wrench. **Tightening torque: 33Nm**
5. Fit the hubcap (4).

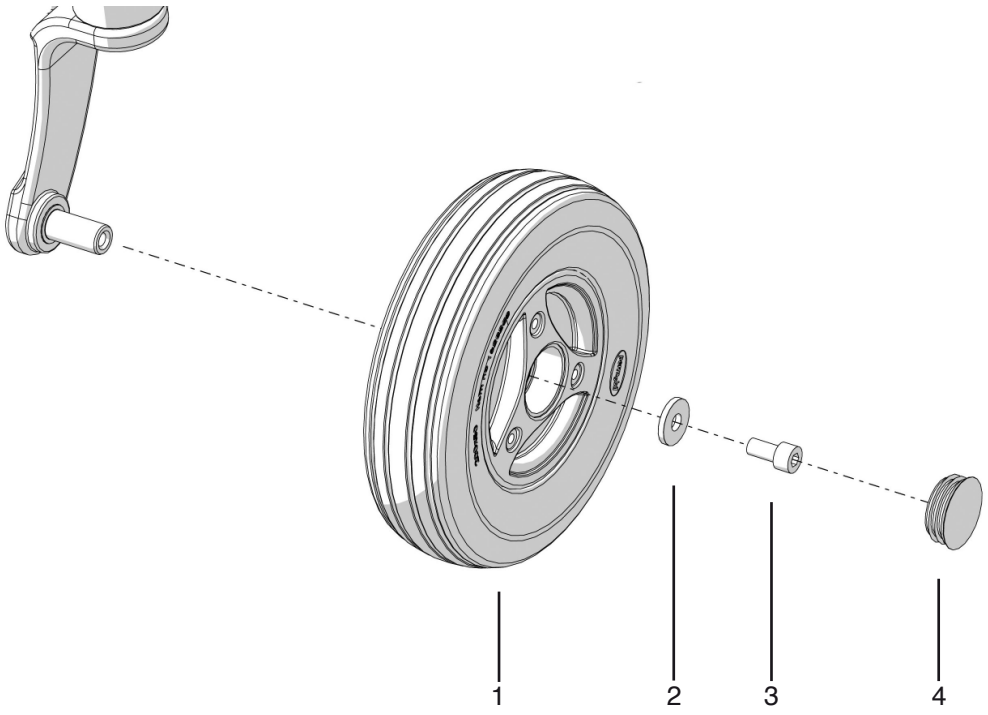
⚠ CAUTION!

The screw must only be used once. Once removed, the screw must therefore never be refitted. Do not use an impact wrench for the tightening torque.

⚠ WARNING!

No type of screw and washer other than those stated here may be used.

Pos.	Description
1	Wheel
2	Washer, 8,5x23x3
3	Screw, ISO 4762 M8x16 10.9 Fe/Zn
4	Hub cap



Pivot wheels

For this task the following tools are necessary:
1 Allen key 5 mm.

Taking the rim apart

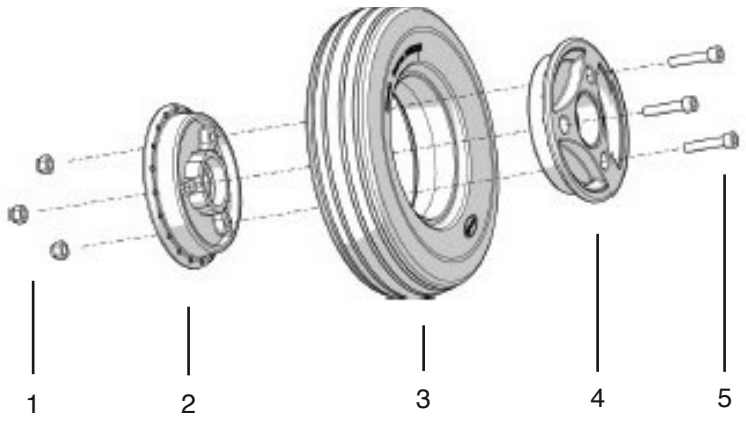
The rim can be taken apart to make it possible to fit/remove solid tires.

1. Remove the wheel in question from the wheelchair. See the previous page.
2. Remove the three screws holding the two halves of the rim together (see illustration).
3. Take the rim apart.

Assembly

Assemble in the reverse order.

1. Fit the two rim halves (2&4) together with tire (3).
2. Tighten the three screws using a torque wrench.
   Tightening torque: 9.8Nm
3. Fit the wheel on to the wheelchair. See previous page.



Pos.	Description
1	Locking nut, ISO 7040 M6 8 FE/n
2	Rim, inner section
3	Tire, Solid 200x50
4	Rim, outer section
5	Screw, ISO 4762 M6x30 8.8 Fe/Zn

Fitting a tire on the split rim.

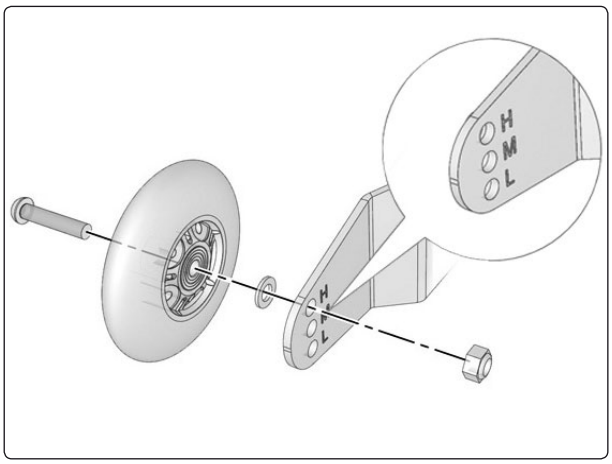
Support Wheels

Support wheels may be fitted in three different positions; low, medium and high. These fitting positions are marked L, M and H.

Low
With the support wheels fitted in the lower position, low, the wheelchair inclines less before the support wheels meet the ground, but the accessibility of the wheelchair is reduced somewhat.

Medium
With the support wheels fitted in the medium position, the wheelchair inclines slightly more before the support wheels meet the ground, but the accessibility of the wheelchair is increased somewhat.

High
The support wheels are fitted as standard in the high position. This position produces the best accessibility, but it also means that the wheelchair may incline more before the support wheels meet the ground, which the user may find unpleasant.



Support wheels may be fitted in three different positions; low, medium and high.

Removal

1. Switch off the main power switch on the control panel.
2. Remove the screw. See figure.

⚠ WARNING!

Removing the support wheels entails an increased risk of the wheelchair tipping over. The wheelchair must not be driven when the support wheels are not fitted.

Fitting

1. Switch off the main power switch on the control panel.
2. Fit the wheel with the screw, washer and nut in the desired position. See figure.

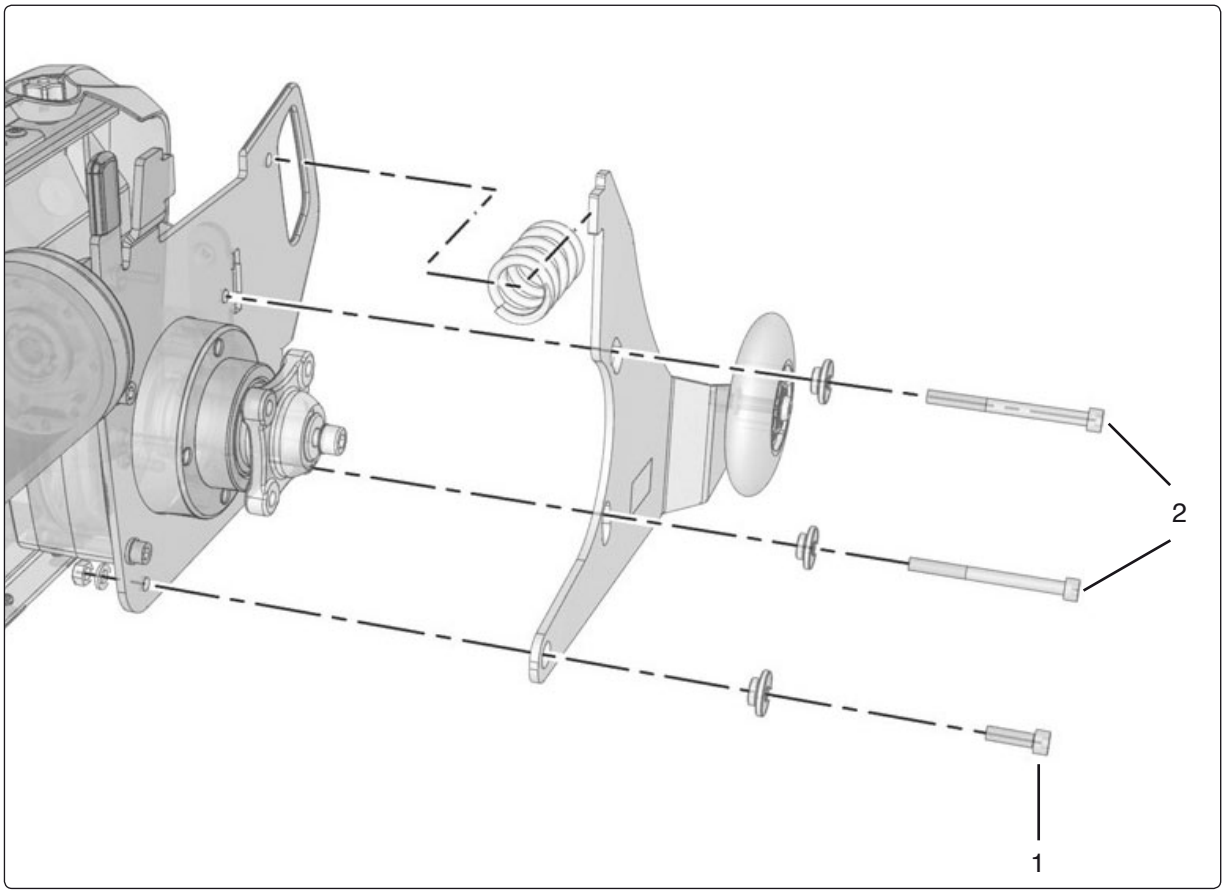
Support wheel bracket

Removal

1. Switch off the main power switch on the control panel.
2. Remove the rear wheel on the side in question. See the illustration above.
3. Remove the two screws (2) that hold the support wheel bracket in place at the rear (see illustration). At the same time, lift the support wheel carefully to make it easier to remove the screws. Please note that the spring in the top edge of the bracket now comes loose.
4. Remove the screw (1) that holds the support wheel bracket in place at the front (see illustration).

Assembly

Assemble in the reverse order. Begin with the front screw (1) and associated spacer and washer. Then replace the spring before fitting the two remaining screws (2) with associated spacers and washers. Lift the support wheel carefully to make it easier to fit the two rear screws.



Attaching the support wheel.

Wheel Forks

Removal

1. Switch off the main power switch on the control panel.
2. Lift up and chock up the wheelchair chassis so that the wheel in question is free of the ground.
3. Remove the cap from the top of the link arm. See figure.
4. Remove the friction plate. It is fitted with one screw from above. See figure.
5. Remove the wheel fork. It is fitted with a nut from above. See figure.

Fitting

Fit the wheel fork in the reverse order.

Fit the O-ring on the friction plate. See figure.

⚠ CAUTION!

Lubricate the O-ring with Lubricant friction brake, Part. no: 1820405

⚠ WARNING!

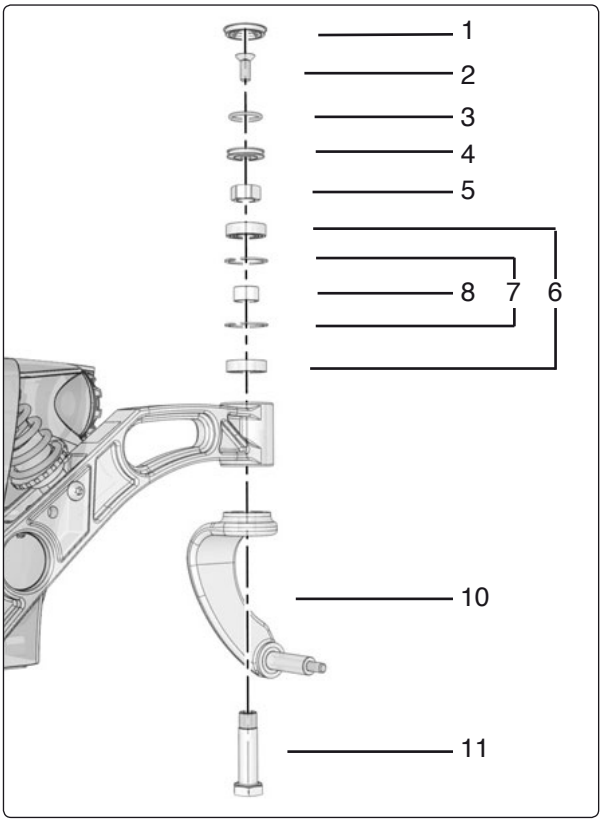
No other type of lubricant than that stated here may be used.

Tighten the nut holding the wheel fork in place with a torque wrench.
Tightening torque: 33 Nm.

Tighten the screw holding the friction plate in place with a torque wrench.
Tightening torque: 15 Nm.

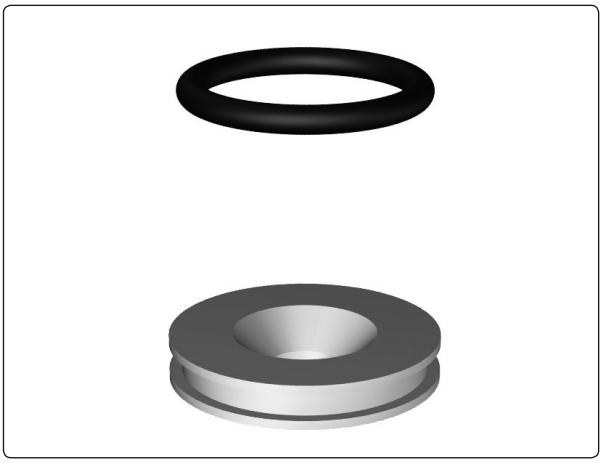
⚠ CAUTION!

Do not use an impact wrench for the tightening torque.



Wheel fork with friction brake.

Pos.	Description
1	Plastic plug
2	Bolt, ISO 10642 M8x20 10.9 Fe/Zn 5 C1/ Locking coat DIN 267-28
3	O-ring Ø24.2x3 EPDM
4	Friction plate ISO 2768-m Fe/Zn 12C1
5	Nut, DIN 934 M14x1.5 8Fe/Zn 8C1
6	Bearing, 6002-2RS1 (15x32x9)
7	Circlip, DIN 472 Ø32
8	Spacer, ISO 2768-m Fe/Zn 12C1 (Ø20 h9)
9	Spacer, ISO 2768-m Fe/Zn 12C1
10	Bolt, ISO 2768-m Stainless
	Lubricant friction brake, Momentum, PRO AA 2/0,025



Fit the O-ring In the groove of the friction plate.

Shock Absorbers

The shock absorbers may be fitted in two different positions, a standard position(suitable for all users) and a position that produces slightly softer suspension(recommended for user's with a body weight of 150 lbs or less).

Removal

1. Raise the seat; seat elevator to the highest position; fixed seat tube to the service position. See page 29. If the seat elevator does not work normally because the batteries are discharged or the actuator is defective, the seat can be raised/lowered manually. See page 26.
2. Switch off the main power switch on the control panel.
3. Remove the chassis cover. See page 8.
4. Lift up and chock up the wheelchair chassis so that the wheel in question is free of the ground.
5. Unscrew and remove the two screws that hold the shock absorber in place. See figure.

Fitting

1. Fit the shock absorber on the chassis with screws and washers.
2. Using screws, washers and nuts, fit the other end of the shock absorber in the position on the link arm that suits the user best.
3. Fit the chassis cover. See page 8.
4. Lower the seat to its normal height.

Adjustment

The shock absorber's spring force should be adjusted to the correct value; see figure.

The spring force can be adjusted for various user weights with the adjusting nut. Reduce the adjustment distance for harder suspension; increase the adjustment distance for softer suspension.

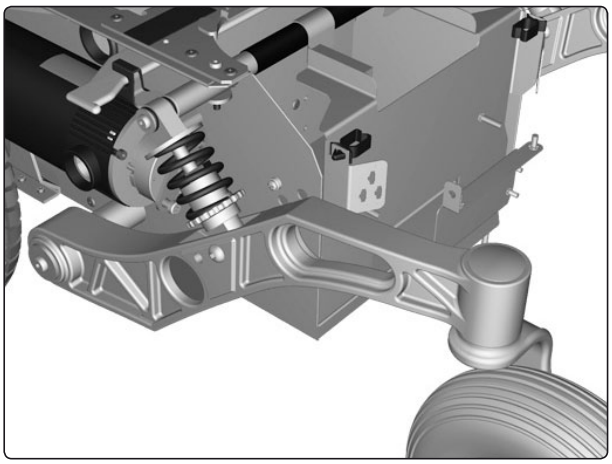
Adjustment can be done with the shock absorber mounted in the chassis, but make sure the wheelchair isn't under influence of any load.

⚠ CAUTION!

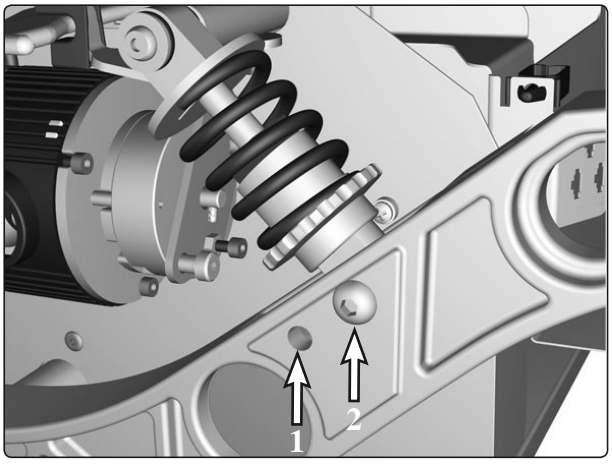
Do not have any load in the wheelchair when adjusting.

⚠ CAUTION!

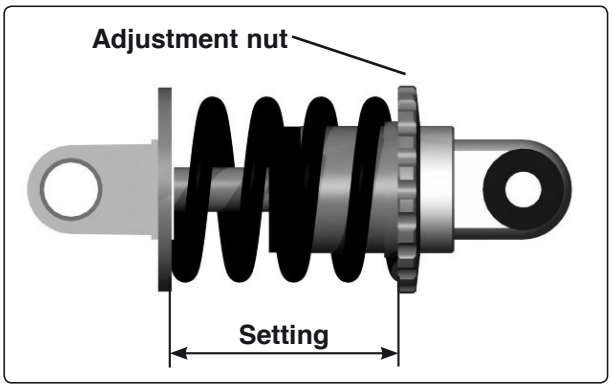
Never adjust the spring to a setting less then 46 mm.



Shock Absorber



Shock Absorbers fitted in standard position.



Adjustment of shock absorber spring	
User weights	**Setting**
0 - 100 Kg.	48 mm.
Above 100 Kg. (standard)	46 mm.

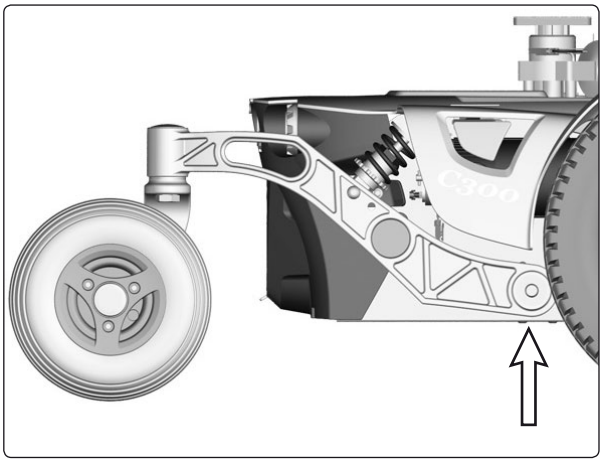
Adjustment of shock absorber spring.

Slewing brackets

Removal

1. Raise the seat; seat elevator to the highest position; fixed seat tube to the service position. See page 29. If the seat elevator does not work normally because the batteries are discharged or the actuator is defective, the seat can be raised/lowered manually. See page 26.
2. Switch off the main power switch on the control panel.
3. Remove the chassis cover.
4. Lift up and chock up the wheelchair chassis so that the wheel in question is free of the ground.
5. Remove the drive wheel, see page 12.
6. Remove the lower shock absorber bracket. See page 19.
7. Remove the link arm, it is fitted with screw and washer.

For removal of wheel forks and wheels, see the respective chapters.



Slewing bracket attachment.

Fitting

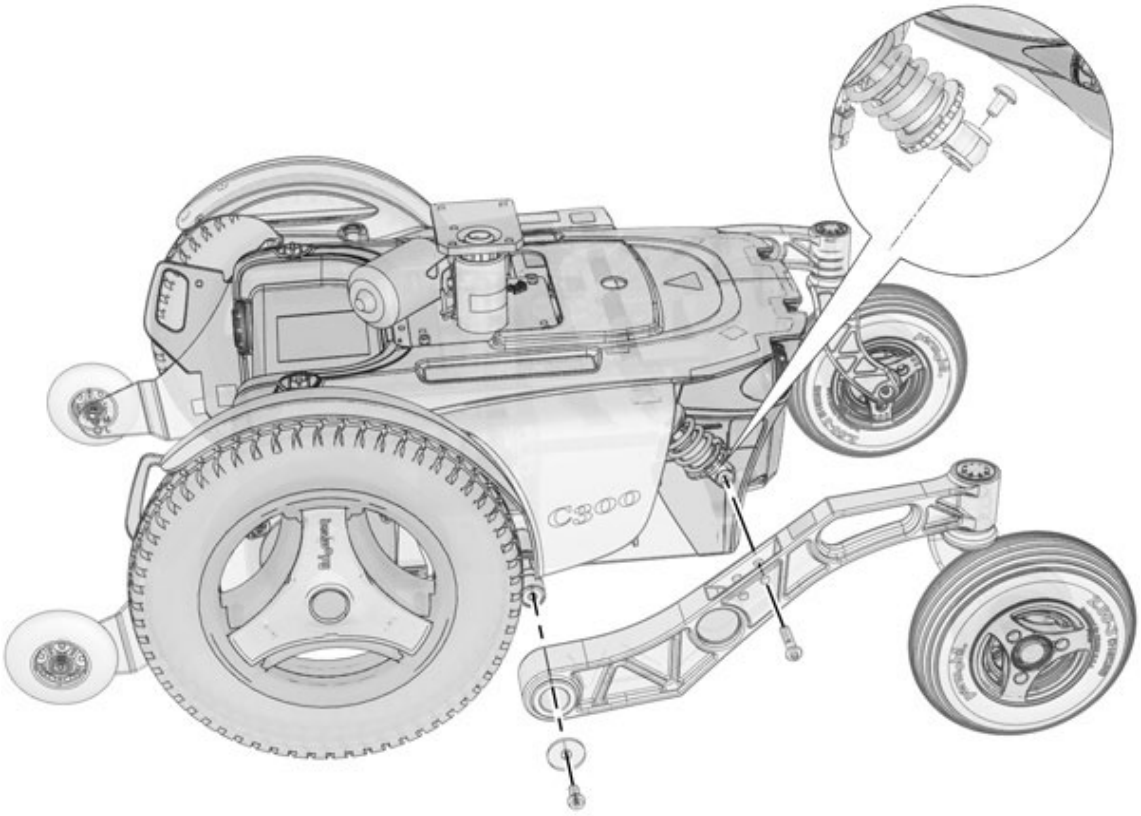
Fit the link arm in the reverse order.

Tighten the screw holding the link arm in place with a torque wrench.

Tightening torque: 15 Nm.

⚠ CAUTION!

Do not use a Pneumatic impact wrench.



Removal/fitting of slewing brackets.

Wheel Lock Release

The wheel lock release consists of a plastic rail, a wheel lock release sensor and a magnetic wheel lock on each drive motor.

Removing the Plastic Rail

1. Raise the seat; seat elevator to the highest position; fixed seat tube to the service position. See page 29. If the seat elevator does not work normally because the batteries are discharged or the actuator is defective, the seat can be raised/lowered manually. See page 26.
2. Switch off the main power switch on the control panel.
3. Remove the chassis cover. See page 8.
4. Remove the wheel lock release sensor, see page 23.

⚠ CAUTION!

Before removing the plastic rail, make sure the wheel lock release sensor is removed.

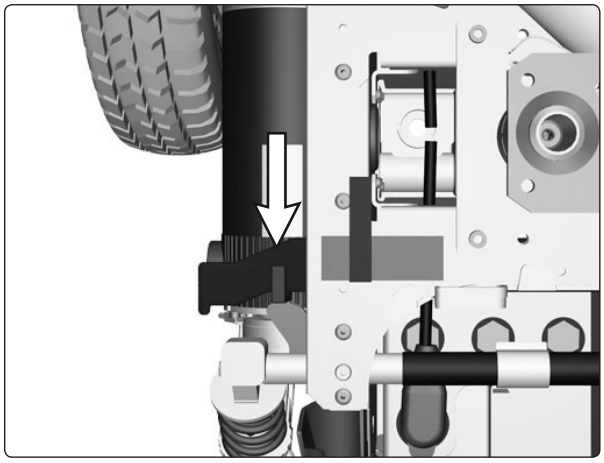
5. If the wheel lock release arm is moved backwards on the left magnetic wheel lock, the plastic rail can be pulled out of the chassis.

Fitting the Plastic Rail

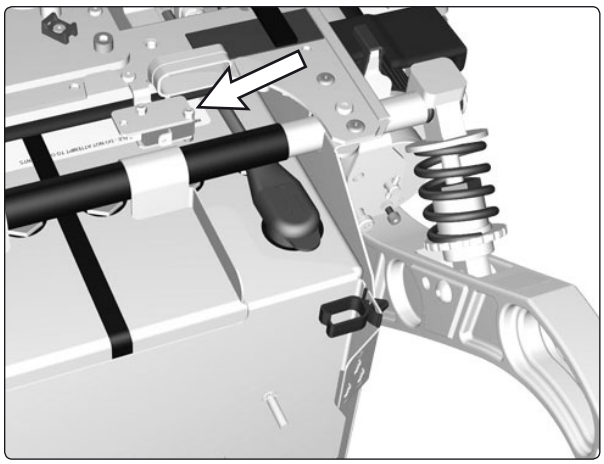
⚠ CAUTION!

Before inserting the plastic rail, make sure the wheel lock release sensor is removed.

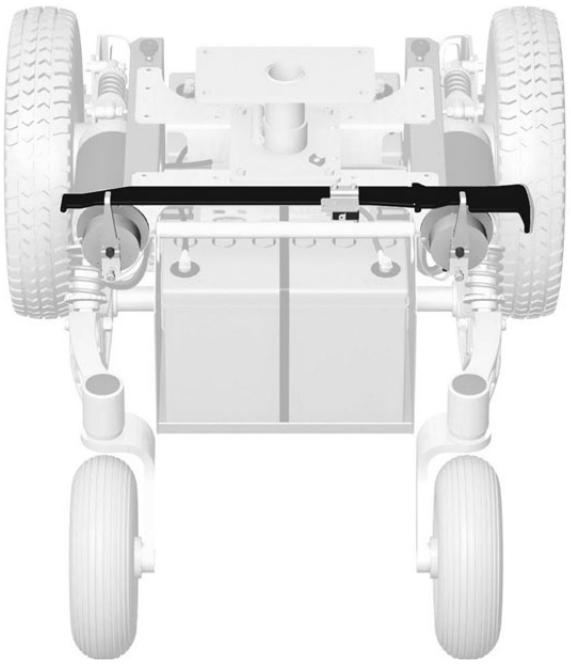
1. Insert the plastic rail on the right side of the chassis.
2. Check that the rail is correctly located by the wheel lock release sensor. See figure.
3. Push the rail in further so that its end emerges on the left side of the chassis.
4. If the wheel lock release arm is moved backwards on the left magnetic wheel lock, the plastic rail can be moved into place.
5. Refit the wheel lock release sencor, see page 23.
6. Refit the chassis cover. See page 8.
7. Lower the seat to its normal height.



If the wheel lock release arm is moved backwards on the left magnetic wheel lock, the plastic rail can be pulled out of the chassis.



Wheel lock release sensor.

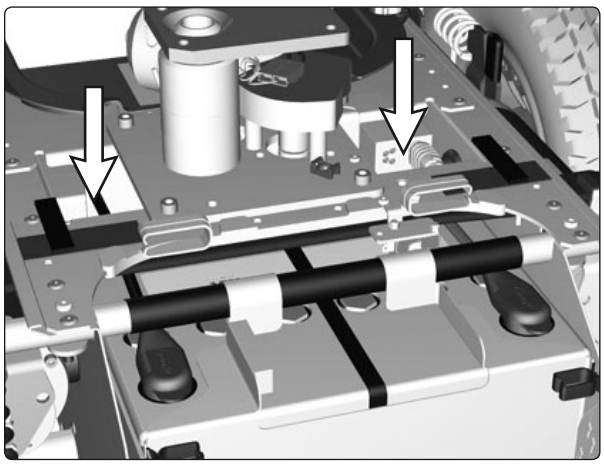


Wheel lock release.

Wheel Lock Release

Removing the Magnetic wheel lock.

1. Raise the seat; seat elevator to the highest position; fixed seat tube to the service position. See page 26. If the seat elevator does not work normally because the batteries are discharged or the actuator is defective, the seat can be raised/lowered manually. See page 24.
2. Switch off the main power switch on the control panel.
3. Remove the chassis cover. See page 8.
4. Disconnect the electrical connection of the magnetic wheel lock. See figure.



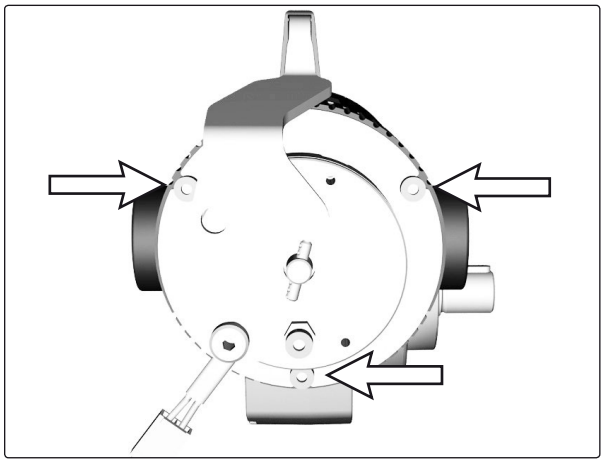
The electrical connections of the wheel locks are positioned on the inside of the chassis, on each side of the seat lift/seat post.

Magnetic wheel lock.

5. Unscrew and remove the three screws that hold the wheel lock in place. See figure.

Fitting the Magnetic Wheel lock

Fit the magnetic wheel lock in the reverse order. Fit the magnetic wheel lock with the release arm facing upwards.

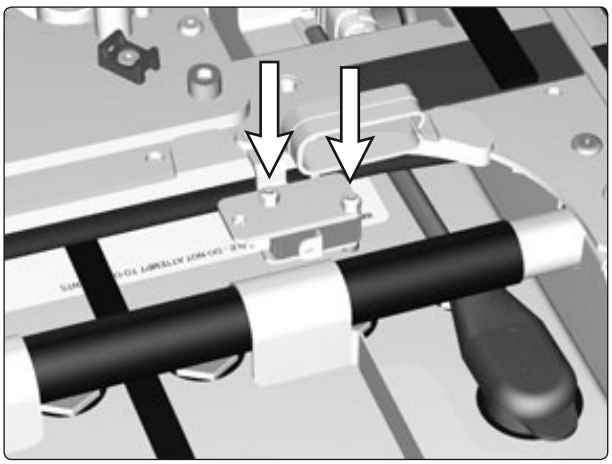


The magnetic wheel lock is fitted with three screws

Wheel Lock Release

Removing the wheel lock release sensor.

1. Raise the seat; seat elevator to the highest position; fixed seat tube to the service position. See page 29. If the seat elevator does not work normally because the batteries are discharged or the actuator is defective, the seat can be raised/lowered manually. See page 26.
2. Switch off the main power switch on the control panel.
3. Remove the chassis cover. See page 8.
4. Disconnect the electrical connection of the wheel lock release sensor, it´s positioned on the top of the front battery.
5. Remove the wheel lock release sensor. It is fitted with two screws. See figure.
6. Remove the plate fitted on the wheel lock sensor. It is fitted with two screws and nuts.



Wheel lock release sensor is fitted with two screws.

Fitting the Wheel Lock Release Sensor

Fit the wheel lock release sensor in the reverse order.

Wheel lock release sensor.

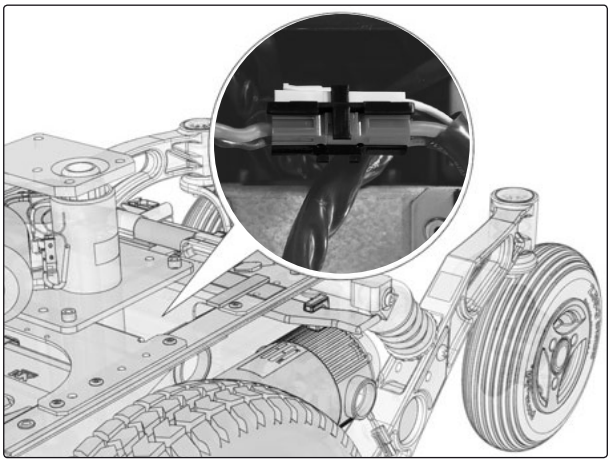
Drive motor

Removal

1. Raise the seat; electric seat lift to the highest position; fixed seat tube to the service position. See page 29. If the electric seat lift does not work normally because the batteries are discharged or the adjustment device is defective, the seat can be raised/lowered manually. See page 26.
2. Switch off the main power switch on the control panel.
3. Remove the chassis covers. See page 8-9.
4. Lift up and chock up the wheelchair chassis so that the wheel in question is free of the ground.
5. Remove the drive wheel. See page 12.
6. Separate the magnetic brake and drive motor cabling at the contacts on the cabling. These are positioned on the inside of the chassis, next to the seat lift. (see fig.). The contacts are mounted together in a holder.
7. Run the connection cables out through the chassis cable duct.
8. Remove the drive motor, it's fitted with four screws (see fig.).

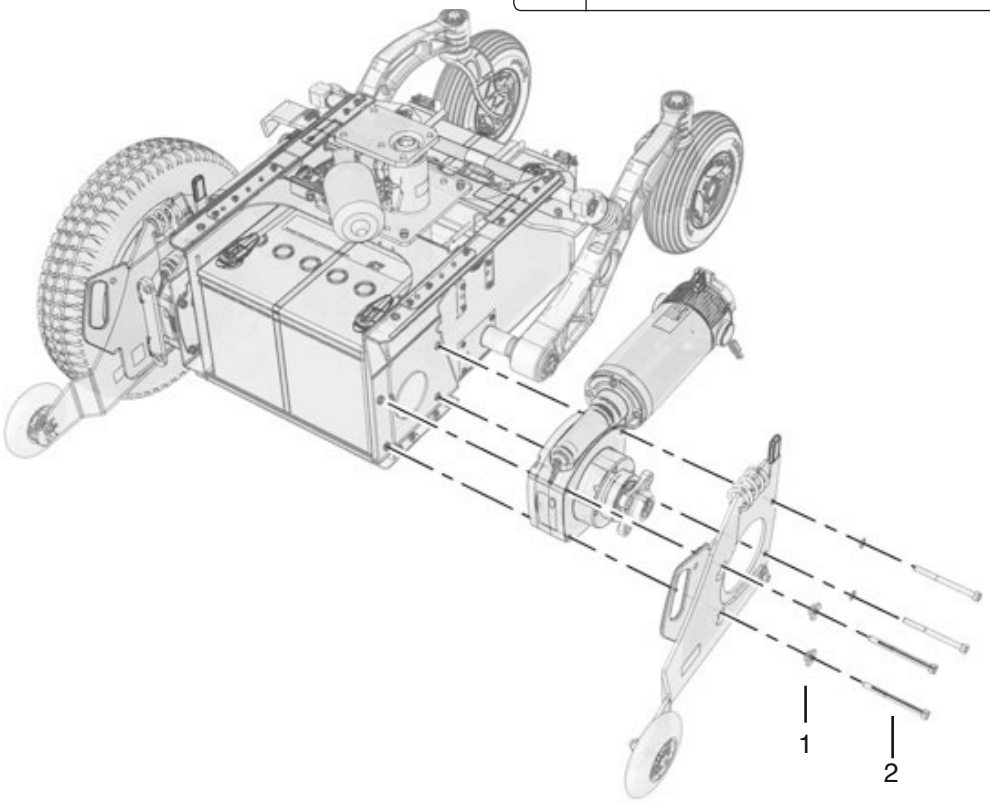
For this task the following tools are necessary:

1 Allen key 5 mm.
1 Allen key 6 mm.



The contacts are mounted together in a holder.

Pos.	Description
1	Screw ISO 4762 M6x60 8.8 Fe/Zn
2	Washer, ISO 7089 6 200 HV Fe/Zn 5 C1(6,4x12x1,6)



Fitting/removing the Drive motor.

Drive motor

Assembly

Assemble in the reverse order.

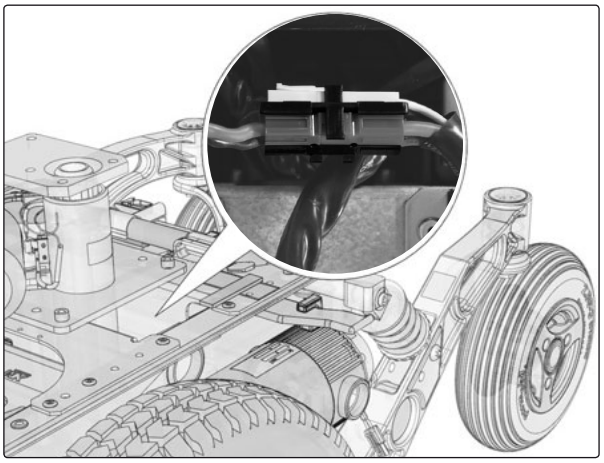
1. Fit the drive motor with the four screws and washers (see fig. below).
2. Run the connection cables in through the chassis cable duct.
3. Connect the magnetic brake and drive motor cabling at the contacts on the cabling. These are positioned on the inside of the chassis, next to the seat lift/seat tube (see fig.). Fit the contacts together in their holder.
4. Fit the drive wheel. See page 12.
5. Fit the chassis covers. See page 8-9.

⚠ CAUTION!

Check the function of the brake release after fitting. When the brakes are released, it should not be possible to drive the wheelchair.

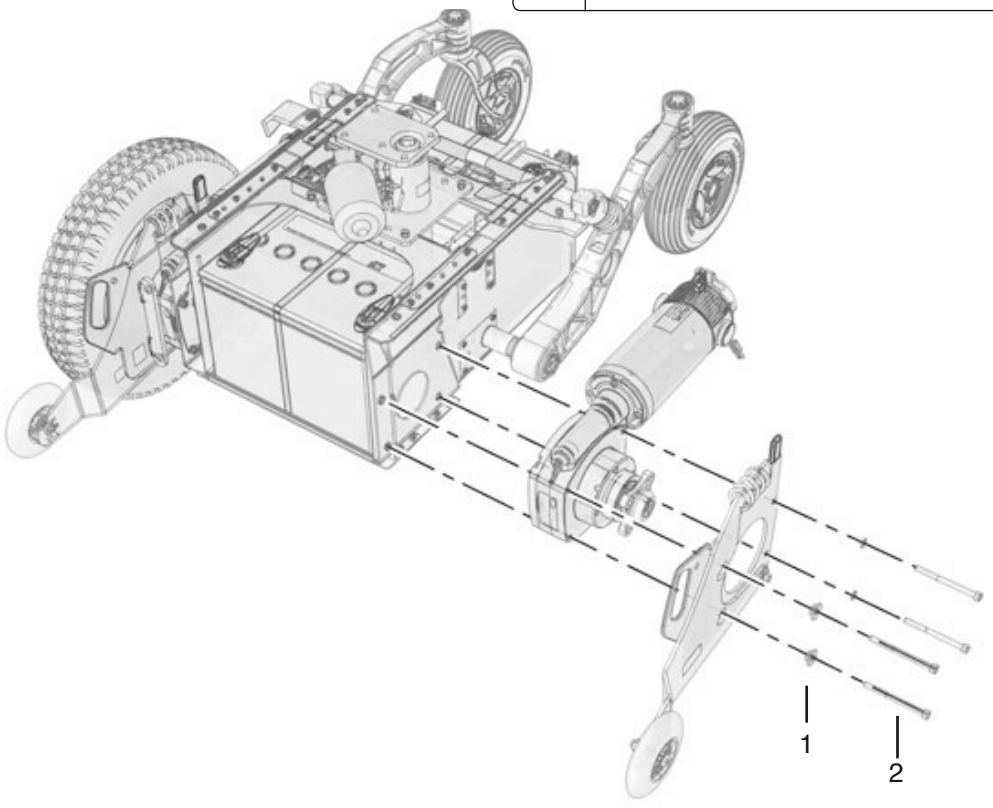
For this task the following tools are necessary:

1 Allen key 5 mm.
1 Allen key 6 mm.



The contacts are mounted together in a holder.

Pos.	Description
1	Screw ISO 4762 M6x60 8.8 Fe/Zn
2	Washer, ISO 7089 6 200 HV Fe/Zn 5 C1(6,4x12x1,6)



Fitting/removing the Drive motor.

Seat elevator

Manual operation of electric seat lift

If the seat lift does not work normally because the batteries are discharged or the adjustment device is defective, the seat can be raised/lowered manually.

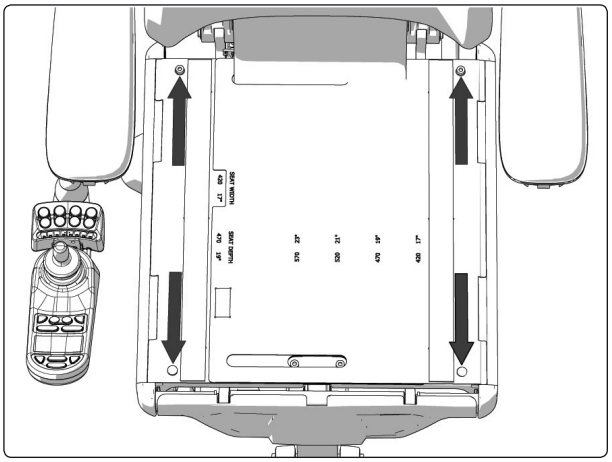
1. Switch off the main power switch on the control panel.

2. Remove the cushion from the seat by lifting it straight up.

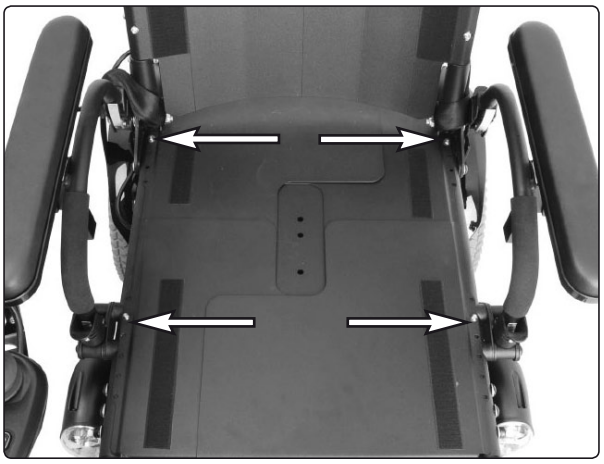
3. Remove the seat plate.

For this task the following tools are necessary:

1 Allen key 4 mm.
1 Seat Lift Crank



The seat plates on Corpus 3G are held in place by two screws at the back edge and two quick-mount clamps at the front.

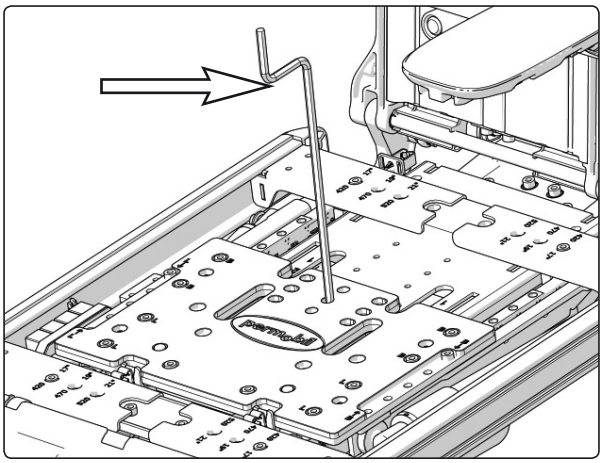


The seat plates on PS seat are held in place by four screws.

4. Raise/lower the seat using the seat lift crank supplied.

⚠ WARNING!

Drills must not be used in connection with manual operation of the seat lift. There is a risk of damage to materials.



Manual raising/lowering of the Corpus seat using the seat lift crank.

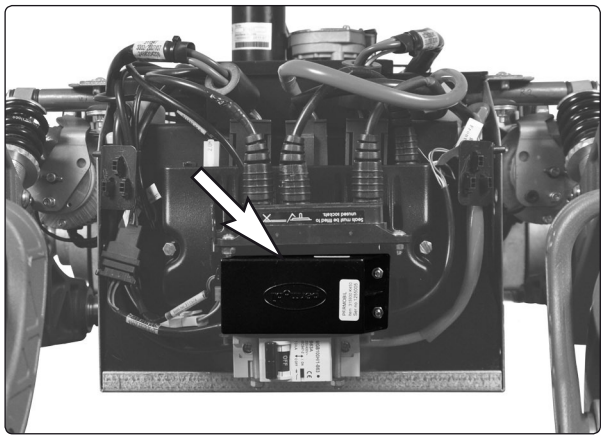
Seat elevator

Removal

For this task the following tools are necessary:

1 Allen key 5 mm.

1. Raise the seat to the highest position. If the electric seat lift does not work normally because the batteries are discharged or the adjustment device is defective, the seat can be raised/lowered manually. See page 26.
2. Switch off the main power switch on the control panel.
3. Remove the upper chassis cover. See page 9.
4. Remove the seat including the seat tilt mechanism if the wheelchair is equipped with such device. See page 33.



ICS General Module is fitted at the rear of the chassis.

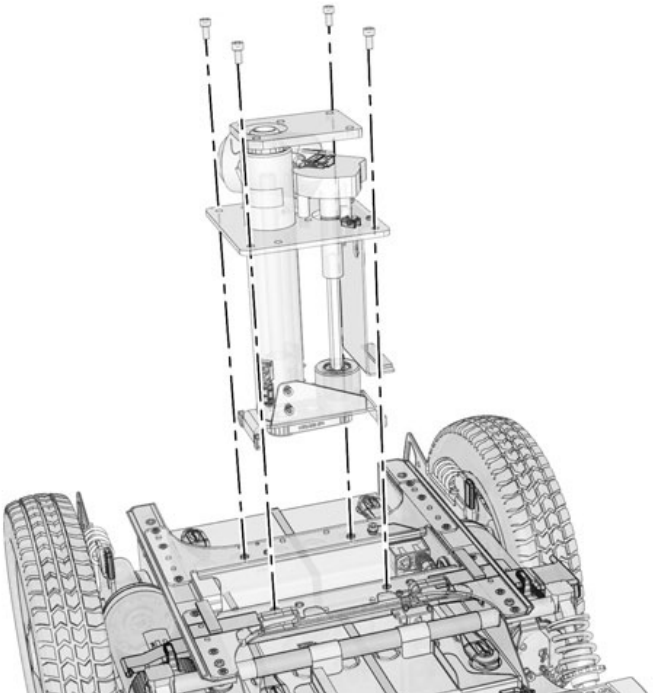
⚠ CAUTION!

The seat is heavy. This work should therefore always be performed by two people. Be careful with the cabling.

5. If the wheelchair is equipped with seat support, remove it. See page 31.
6. Remove the seat lift, it's fitted with four screws (see fig. below).
7. **VR2**
   Separate the seat lift cabling at the contacts on the cabling.

   R-net
   Disconnect the seat lift cabling from the ICS general module.
8. Lift the seat lift straight up out of the chassis.

ICS General Module.



Seat elevator

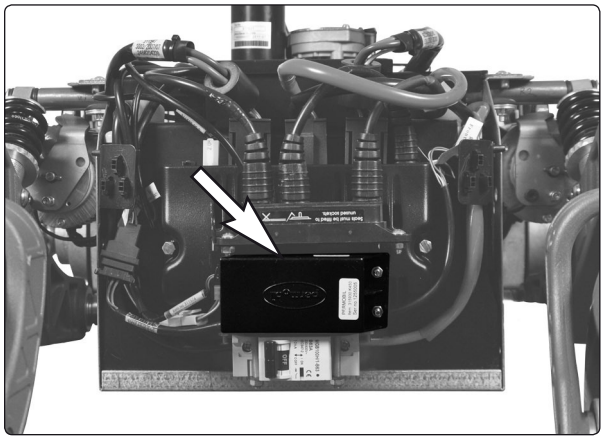
Assembly

Assemble in the'reverse order.

1. Fit the seat lift into the chassis using the four screws (see fig. below). If the wheelchair is equipped with seat support, mount it. See page 31.
2. **VR2**
   Connect the seat lift cabling at the connector on the cabling.

   R-net
   Connect the seat lift cabling to the ICS general module.

For this task the following tools are necessary:
1 Allen key 5 mm.



ICS General Module is fitted at the rear of the chassis.

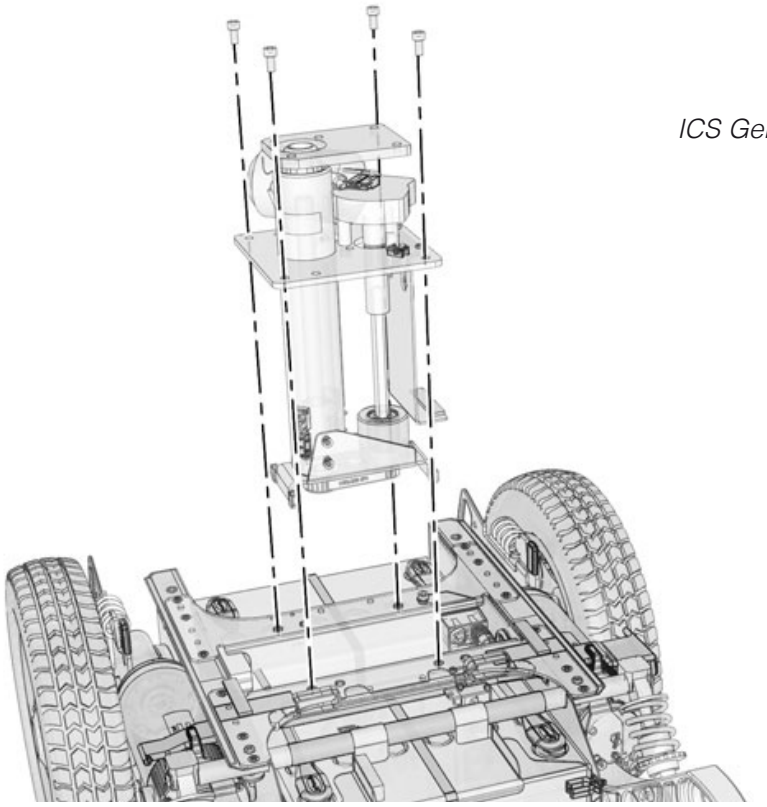
3. Fit the seat including the seat tilt mechanism if the wheelchair is equipped with such device. See page 33-34.

⚠ CAUTION!

The seat is heavy. This work should therefore always be performed by two people. Be careful with the cabling.

4. Fit the upper chassis cover. See page 9.

ICS General Module



Fixed seat tube

Service position

The fixed seat tube can be raised to the service position to make it easier to set the fixed seat height and other service tasks on the wheelchair.

1. Loosen the screw that locks the fixed height position of the seat tube (see fig.). The seat is now pressed upwards by the integrated gas spring of the seat tube.
2. Lock the seat tube in the upper position using the screw before starting any other work (see fig.).

⚠ WARNING!

Always lock the seat tube in the upper position using the screw before starting any other work.

To return to normal position, undo the screw locking the seat tube height position, and push the seat downwards until the head of the height adjustment screw is in the recess in the outer tube of the seat tube (see illustration).

⚠ WARNING!

The seat must not be subjected to load and the wheelchair must not be driven with the fixed seat tube in the service position.

Make sure that the head of the height adjustment screw is in the recess in the outer tube of the seat tube after work is completed.

Adjusting the seat height

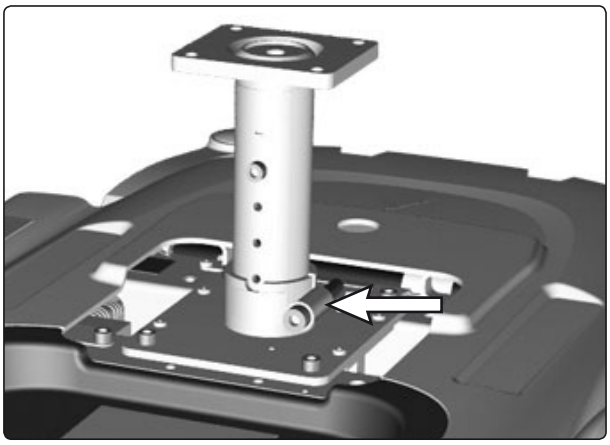
The length of the fixed seat tube can be adjusted to five different fixed positions.

1. Adjust the seat tube to the service position (see above).
2. Screw the height adjustment screw in place in the desired height position. See the illustration. The three holes in positions that raise the seat above the standard position are plugged with plastic screws. If one of these three holes is to be used, the plastic screw must first be removed.

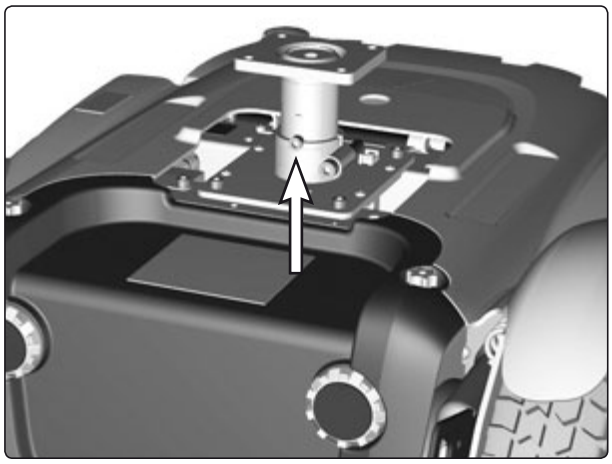
   With the seat Corpus 3G the height adkustment screw should never be mounted in position 1 or 2. See fig.

For this task the following tools are necessary:

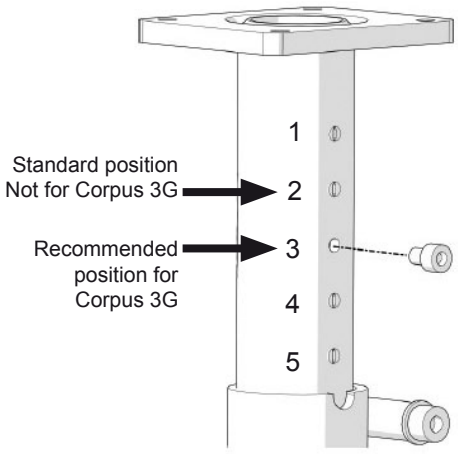
1 Allen key 5 mm.
1 Allen key 6 mm.



Locking screw for the seat tube height position.



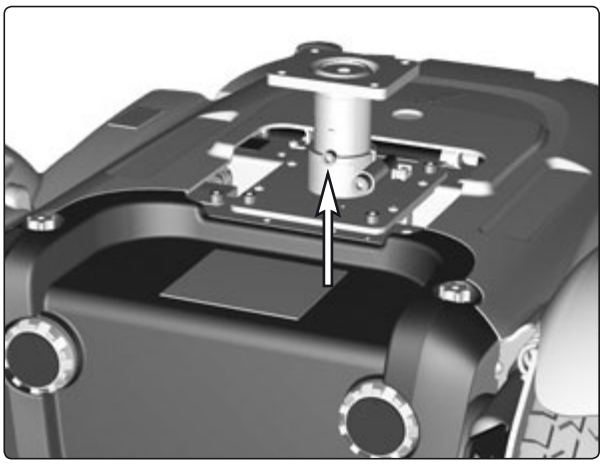
Turn the seat so that the height adjustment screw ends up in the groove in the outer tube.



Position of the height adjustment screw.

Fixed seat tube

3. Undo the screw locking the seat tube height position, and push the seat downwards. Turn the seat so that the head of the height adjustment screw is in the groove in the outer tube of the seat tube (see illustration).
4. Tighten the screw that locks the fixed height position of the seat tube.



Turn the seat so that the height adjustment screw ends up in the groove in the outer tube.

Removing the fixed seat tube

For this task the following tools are necessary:
1 Allen key 5 mm.

1. Raise the seat to the service position (see previous page).
2. Switch off the main power switch on the control panel.
3. Remove the upper chassis cover. See page 9.
4. Remove the seat including the seat tilt mechanism if the wheelchair is equipped with such device. See page 33-34.

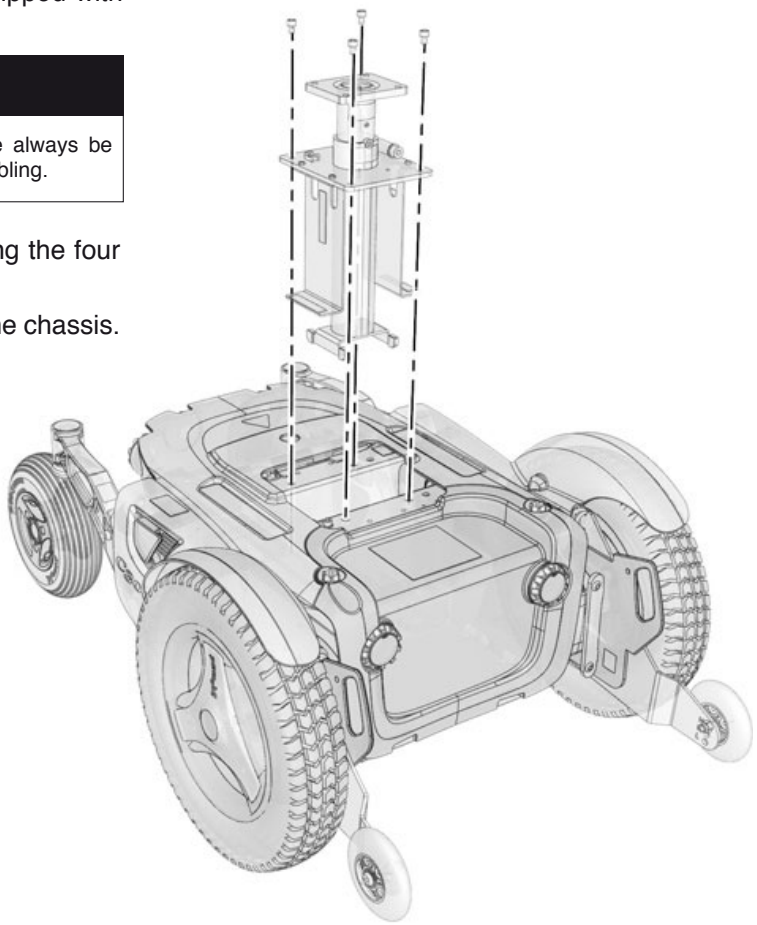
⚠ CAUTION!

The seat is heavy. This work should therefore always be performed by two people. Be careful with the cabling.

5. Remove the seat tube by unscrewing the four screws (see fig.).
6. Lift the seat tube straight up out of the chassis.

Assembly

Assemble in the reverse order.



The Fixed seat tube is fitted with four screws.

Seat support

For this task the following tools are necessary:
1 Allen key 5 mm.

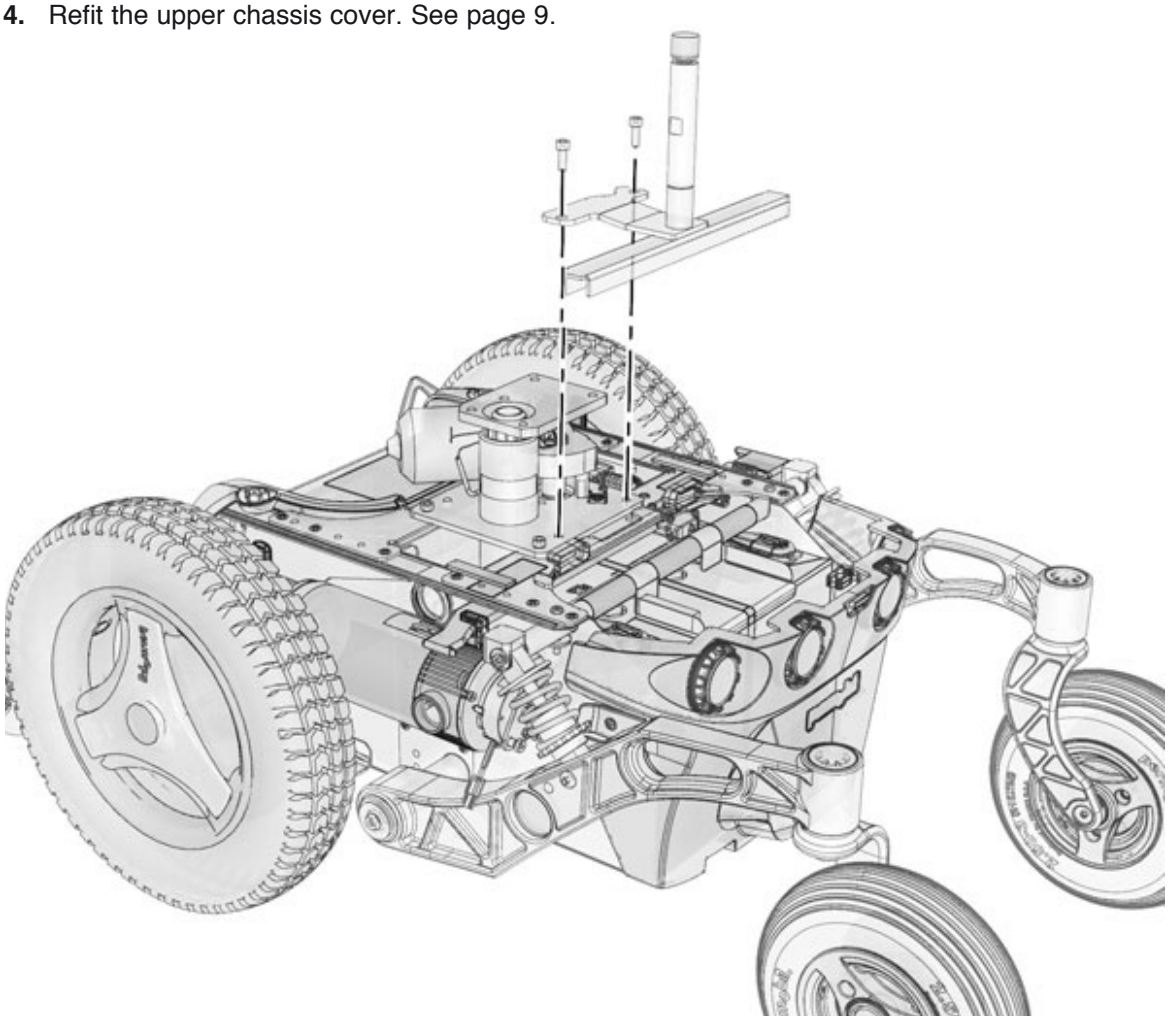
The chassis can be equipped with a seat support. The seat support is fitted behind the seat lift.

1. Raise the seat to the highest position. If the electric seat lift does not work normally because the batteries are discharged or the adjustment device is defective, the seat can be raised/lowered manually. See page 26.
2. Switch off the main power switch on the control panel.
3. Remove the upper chassis cover. See page 9.
4. Remove the seat support, it is fitted with two screws. Se fig. below.
5. Lift the seat support out of the chassis. If the seat support is not supposed to be refitted, refit the right screw which also holds the seat lift (see fig. below).

Assembly

Assemble in the reverse order.

1. Fit the rubber cushion according to description on page 32.
2. If fitted, remove the rear right fastening screw of the seat lift.
3. Place the seat support in the chassis and mount it with the two screws (see fig. below). The right screw holds both seat support and seat lift.
4. Refit the upper chassis cover. See page 9.



The Seat support is fitted with two screws.

Seat support

For this task the following tools are necessary:
1 Allen key 5 mm.

Removal of rubber cushion

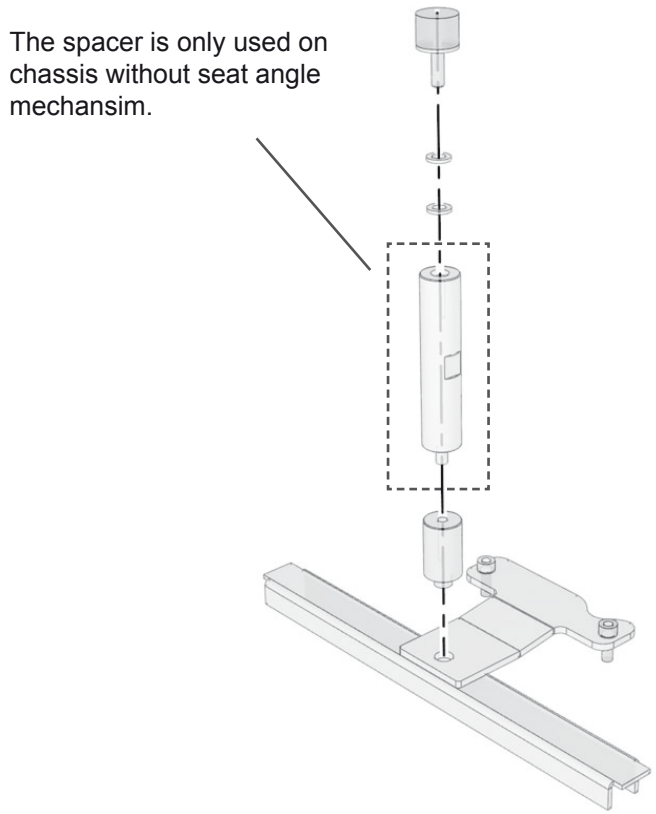
1. Remove the rubber cushion by turning it counterclockwise (see fig.).

Fitting of rubber cushion

The rubber cusions bracket can be fitted in two different positions, laying down or standing. This is to suit both standard Tilt and Anterior Tilt (-5°). Fit the bracket laying down together with ”standard tilt”. Fit the bracket standing together with Anterior tilt (-5°) (see fig. below).

Changing the position of the bracket

1. Remove the seat support. See description on previous page.
2. Remove the rubber cushion bracket, it is fitted with two screws from underneath (see fig.).
3. Rotate the bracket 90° and fit with the two screws (see fig.).
4. **Fit the rubber cushion**
   On wheelchairs without seat tilt mechanism, fit the spacer on the bracket by turning it clockwise untill it is fully located on the bracket.
5. Fit the rubber cushion without washers by turning it clockwise untill it is fully located on the bracket, or on wheelchair without seat tilt mechansim, untill it is fully located on the long spacer. Lower the seat lift. Verify how the height of the seat support correspond with the height of the seat when the seat lift has reched its lowest position. At the correct height the rubber cushion should be compressed 3 mm. as the seat lift reaches its lowest position.
6. **If needed, adjust the seat support height**
   Adjust the height of the seat support by raising the seat lift, removing the rubber cushion and fit suitable number of the attached washers between the rubber cushion and its bracket, or on wheelchair without seat tilt mechansim, between the rubber cushion and the long spacer. After performed adjustment, verify how the height of the seat support correspond with the height of the seat when the seat lift has reached its lowest position. At the correct height the rubber cushion should be compressed 3 mm. If needed, perform the adjustment once again.



The rubber cushion’s bracket can be fitted in two different positions, laying down or standing. The spacer is only used on chassis without seat angle mechansim.

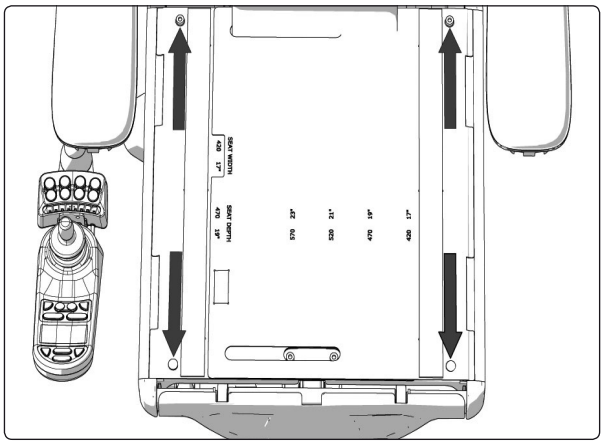
Seats

Removal of Corpus 3G

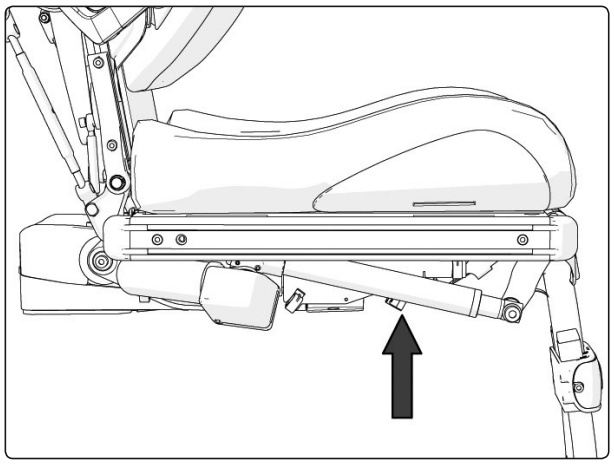
För detta arbete behövs följande verktyg:

1 st. Insexnyckel 5 mm.
1 st. Insexnyckel 6 mm.

1. Raise the seat to the highest position. If the electric seat lift does not work normally because the batteries are discharged or the adjustment device is defective, the seat can be raised/lowered manually. See page 26.
2. Switch off the main power switch on the control panel.
3. Remove the cushion from the seat.
4. Remove the seat plates, which are held in place by two screws at the back edge and two quick-mount clamps at the front. See the illustration. First remove the screws, then use your hand to carefully push the seat plate from below to release the quick-mount clamps at the front.
5. Remove the control panel. Loosen the control panel cabling from its fixing points. Remember how the cabling is positioned; this helps when you come to re-attach it.
6. On wheelchair equipped with seat tilt, separate the cabling for the seat angle mechanism at the contact on the cabling. The contact is at the front right corner of the seat angle mechanism, next to the other cabling (see fig.).



Sitsplåtarna på Corpus 3G sitter monterade med två skruvar i bakkant samt två snabbfästklämmor i framkant.

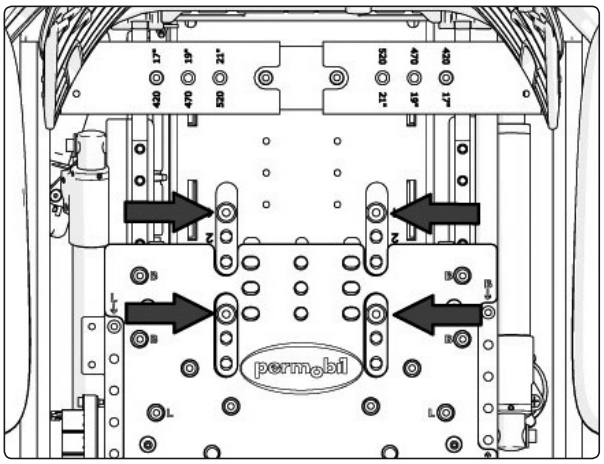


The connector is on the cabling at the front right corner of the seat angle mechanism, next to the rest of the cabling

7. Remove the four screws that hold the seat in place (see fig.). The seat can be mounted in three different positions, depending on the currant seat depth. Note the position the seat is mounted in for future reference.
8. Lift the seat off the seat lift/seat column.

⚠ CAUTION!

The seat is heavy. This work should therefore always be performed by two people. Be careful with the cabling.



The seat is held in place by four screws.

Seats

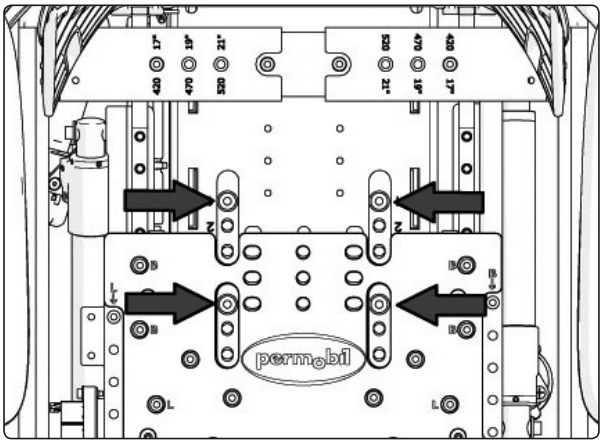
Assembly of Corpus 3G

For this task the following tools are necessary:

1 Allen key 5 mm.
1 Allen key 6 mm.

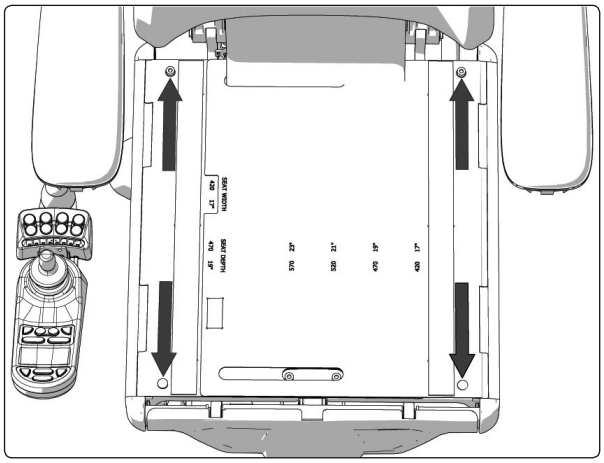
Assemble in the reverse order.

1. Mount the seat using the four screws. See the fig. It can be mounted in three different positions, depending. For more information, see the seats service manual.
2. Fit the control panel. See page 35.
   Re-attach the cabling to its fixing points.



The seat is held in place by four screws.

3. Mount the seat plates by first mounting them with the quick-mount clamps at the front and then the screws at the back. Fit the quick-mount clamps by pushing them straight into the holes.
4. Fit the cushion in desired position by pressing it against the seat plates.
5. Lower the seat to desired position. If the electric seat lift does not work normally because the batteries are discharged or the adjustment device is defective, the seat can be raised/ lowered manually. See page 26.



The seat plates on Corpus 3G are held in place by two screws at the back edge and two quick-mount clamps at the front.

Control Panel R-net

For this task the following tools are necessary:
1 Allen key 4 mm.

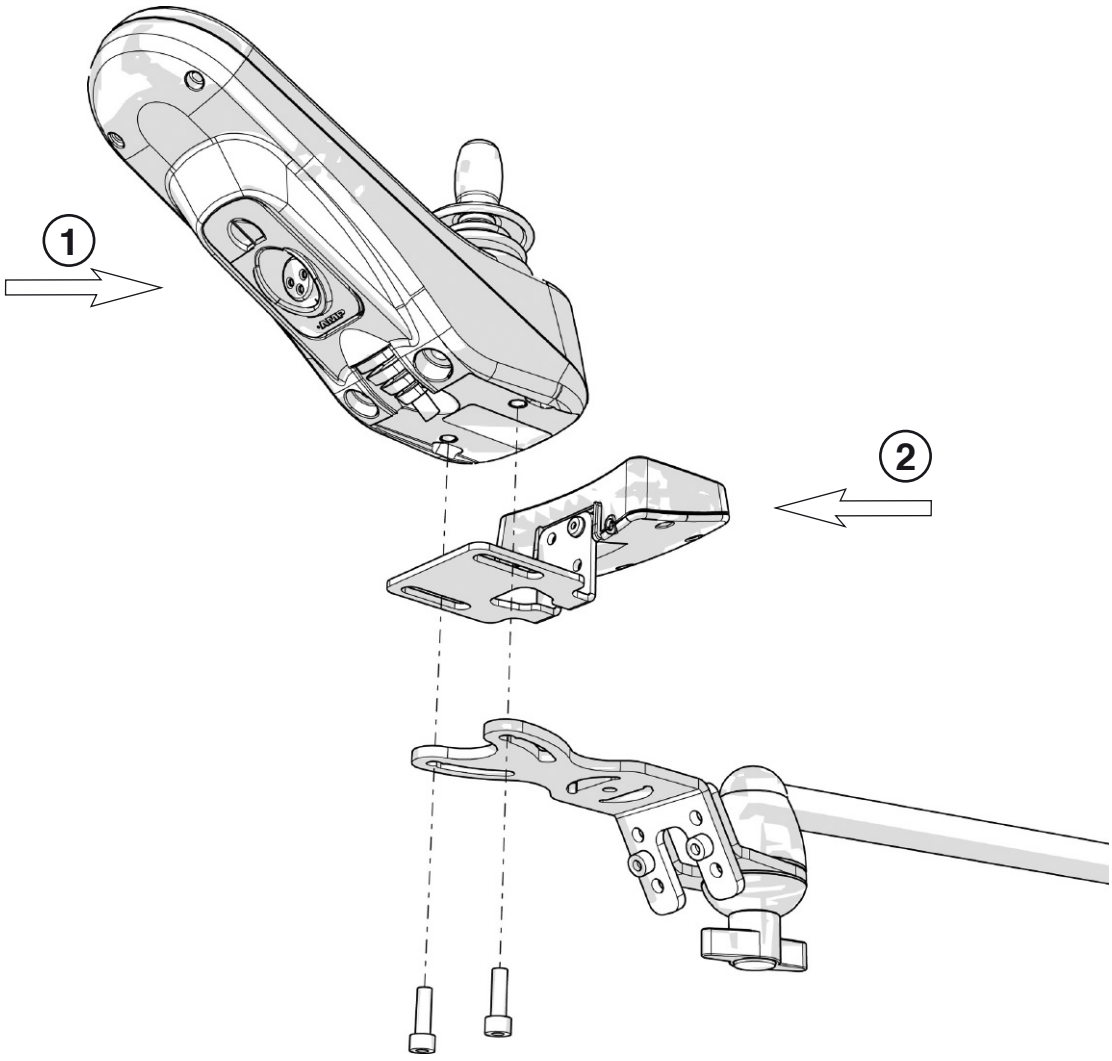
Removal

1. Switch off the main power switch on the control panel.
2. Loosen the control panel cabling from its fixing points. Remember how the cabling is positioned; this helps when you come to re-attach it. On Corpus 3G, a cover (3) on the the arm rest has to be removed, it is fitted with two screws.
3. Separate the control panel cabling at the connector on the cabling.
4. Remove the control panel (1). It is held in place with two screws (see illustration). These two screws also hold the bracket for the ICS control panel (2), if there is one fitted (see illustration).

Assembly

Assemble in the reverse order.

1. Fit the control panel (1) with the two screws (see fig.). Also fit the bracket for the ICS control panel (2), if the wheelchair is equipped with one, with the same screws (see fig.).
2. Connect the control panel cabling at the connector on the cabling.
3. Re-attach the cabling to its fixing points. On Corpus 3G, refitt the cover (3) on the the arm rest using the two screws.

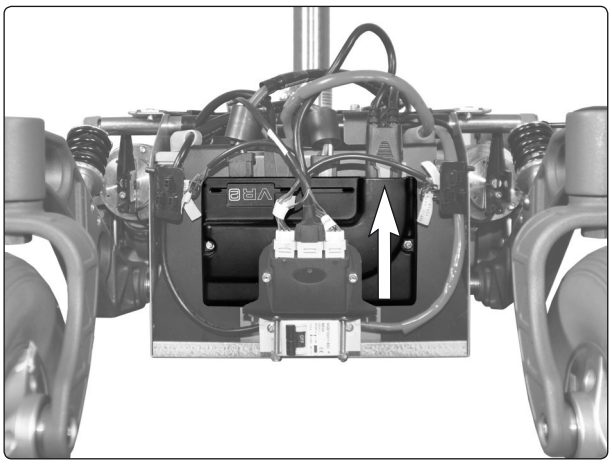


The control panel ans ICS is attached with two screws.

Control panel VR2

Removal

1. Remove the upper and rear chassis cover. See page 8.
2. Remove the cable ties holding the control panel cabling in place. Note the positions of the cable ties for subsequent fitting.
3. Disconnect the control panel cabling from the output stage (see illustration).

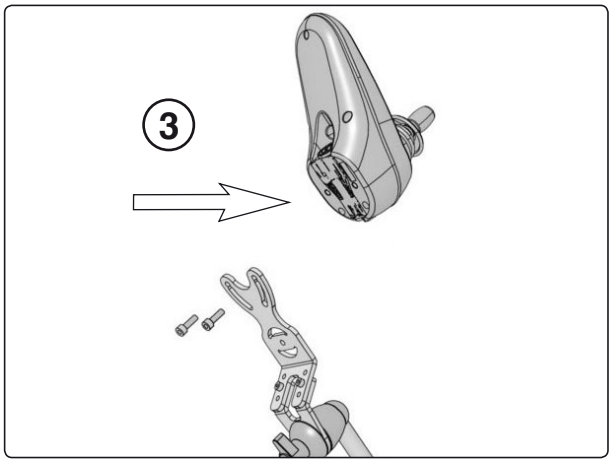


The control panel cabling is connected to the output stage.

4. Remove the control panel (3). It is held in place with two screws underneath (see illustration).

Assembly

Assemble in the reverse order.

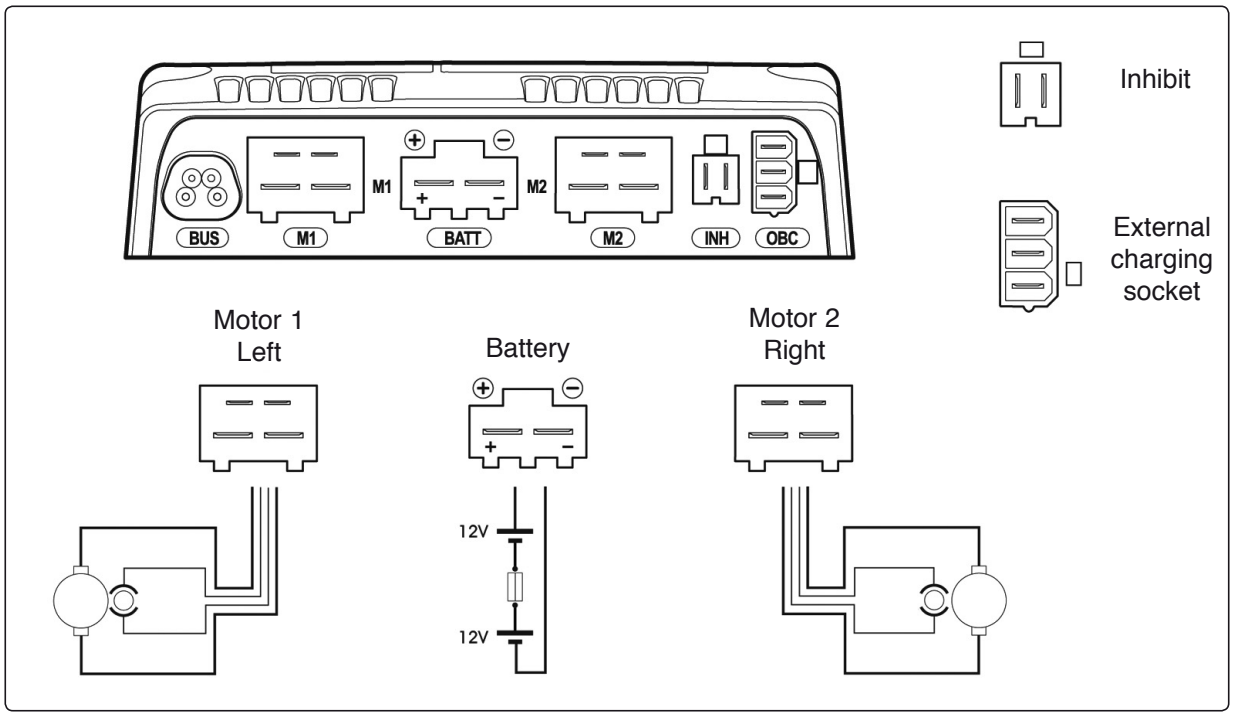


The control panel is held in place with two screws.

Output stage R-net

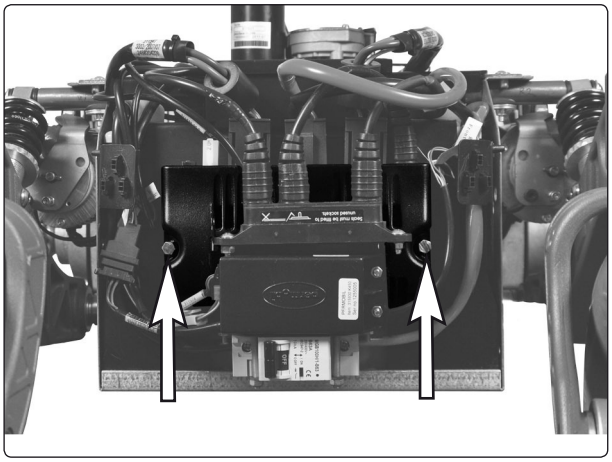
Removal

1. Switch off the main power switch on the control panel.
2. Remove the chassis covers. See page 8.
3. Disconnect the electrical connections from the output stage. Note their positions (see illustration below).



Output stage cable connections. (R-net)

4. Remove the output stage by unscrewing its two mounting screws. See fig.



The output stage is fitted with two screws.

Assembly

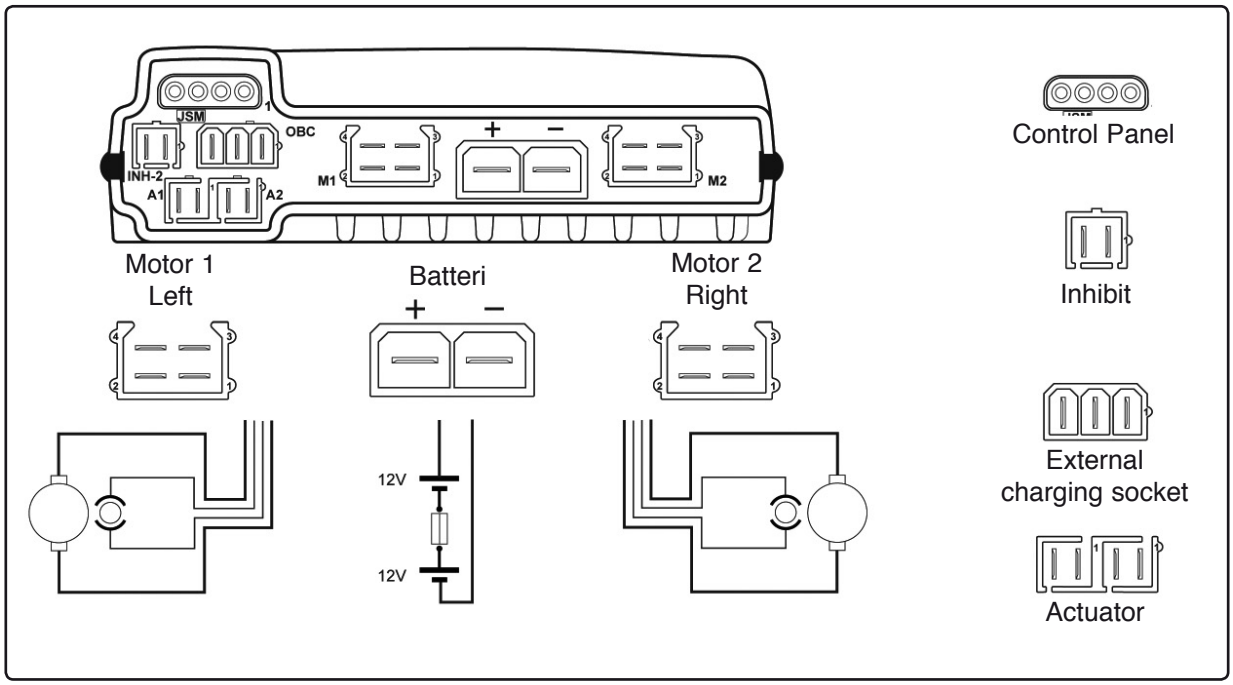
Assemble in the reverse order.

1. Fit the Power Module with the two nuts (see fig. above).
2. Connect the electrical connections to the Power Module. Note their positions (see fig. above).
3. Fit the chassis covers. See page 8-9.
4. Switch the main fuse to ON. See page 42.

Output stage VR2

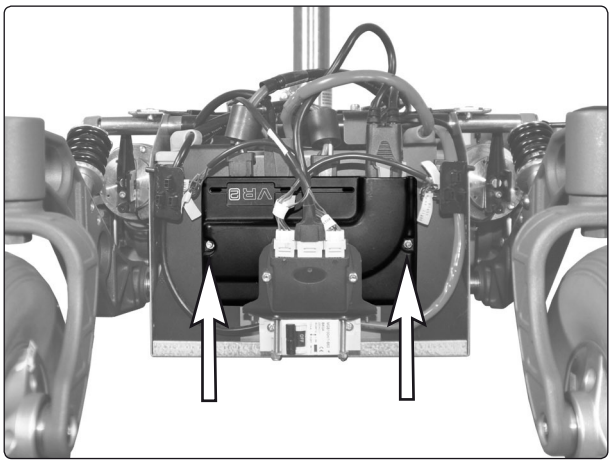
Removal

1. Switch off the main power switch on the control panel.
2. Remove the chassis covers. See page 8.
3. Disconnect the electrical connections from the output stage. Note their positions (see illustration below).



Output stage cable connections. (VR2)

4. Remove the output stage by unscrewing its two mounting screws. See the figure. On a chassis fitted with lights, remove the lights module. See page 39.



The output stage is fitted with two screws.

Assembly

Assemble in the reverse order.

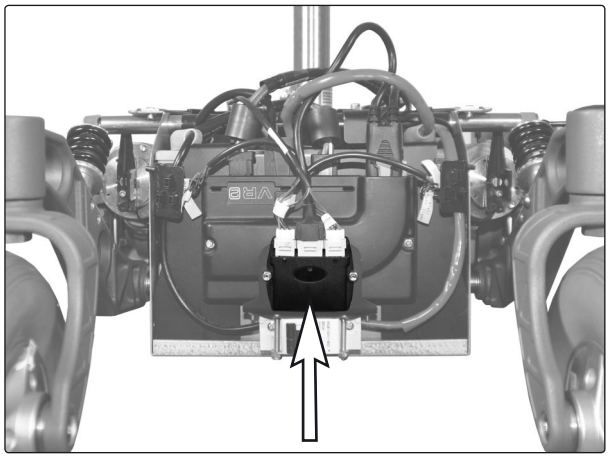
1. Fit the Power Module with the two nuts (see fig. above).
2. Connect the electrical connections to the Power Module. Note their positions (see fig. above).
3. Fit the chassis covers. See page 8-9.
4. Switch the main fuse to ON. See page 42.

Lights module

(Only applies to chassis with VR2 and lights.)

Removal

1. Switch off the main power switch on the control panel.
2. Remove the upper and rear chassis covers. See pages 8-9.
3. Disconnect the electrical connections from the lights module. Note their positions for subsequent fitting.
4. Remove the lights module. It is fitted with Velcro at the rear.



Lights module.

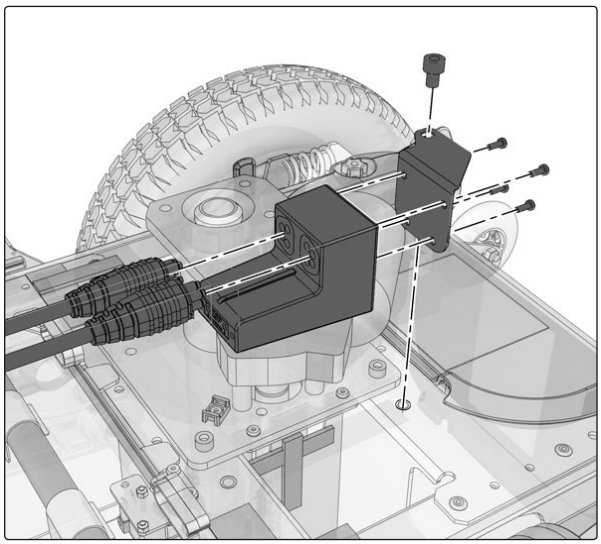
Assembly

Assemble in the reverse order.

ESP-module

Removal

1. Raise the seat lift to its highest position. To raise the seat on a chassis with a fixed seat tube, see page 29. To raise the seat on a chassis with an electric seat lift that does not work normally because the batteries are discharged or the adjustment device is defective, see page 26.
2. Switch off the main power switch on the control panel.
3. Remove the chassis cover - see page 8.
4. The ESP module is fitted at the middle of the chassis. Remove the ESP module with bracket, it's fitted with one screw. See figure.
5. Remove the cables from the ESP module by pulling them straight out. See figure.
6. Remove the ESP module from its bracket, it's fitteed by four screws. See figure.



ESP-modul.

Fitting

1. Fit the ESP module to the bracket using the four screws. See figure.
2. Connect the cables to the ESP module by pressing them straight in. See figure.
3. Fit the ESP module with bracket in the chassis using the attached screw. See figure.
4. Refit the chassis cover. See page 8.

ICS master module

(Only applies to chassis with R-net.)

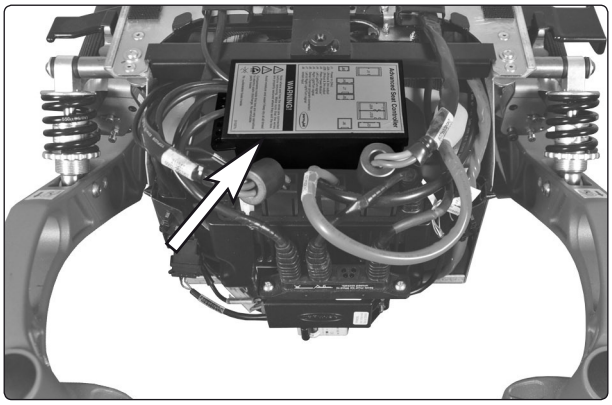
The wheelchair seat may be equipped with an ICS control system, and if so, the seat is controlled from the system's ICS master module. This is fitted in the wheelchair chassis.

Removal

1. Raise the seat to the highest position. If the electric seat lift does not work normally because the batteries are discharged or the adjustment device is defective, the seat can be raised/lowered manually. See page 26.
2. Switch off the main power switch on the control panel.
3. Remove the chassis covers. See page 8-9.
4. Lift the master module upright of its holder (see fig.).
5. Pull the cover off.
6. Cut off the cable ties that hold the cables and detach the electrical connections. Note their positions for subsequent fitting.

Assembly

Assemble in the reverse order.



ICS master module loose in its holder.

Intelligent Control System
J1
J2A
J2B
J3
J4
J5
J6
J7
J8
J1 Power in (24v)
J2A LIN-bus & 24v output
J2B LIN-bus & 24v output
J3 Pilot+ Power Module™
J4 Left Light/Turn signal
J5 Right Light/Turn signal
J6 Serial Channel (program connector)
J7 Left & Right Light/Turn signal
J8 Inhibit input
permobil
WARNING!
Note where and how the wires are connected before removing. Make sure that the wires are properly secured where they exit the box.
Avoid moisture and water! Keep dry at all times!
Components inside this box are very sensitive to electro static discharge. No servicable parts inside.
No replaceable fuses inside.
315279

ICS master module with cover removed.

Fuses

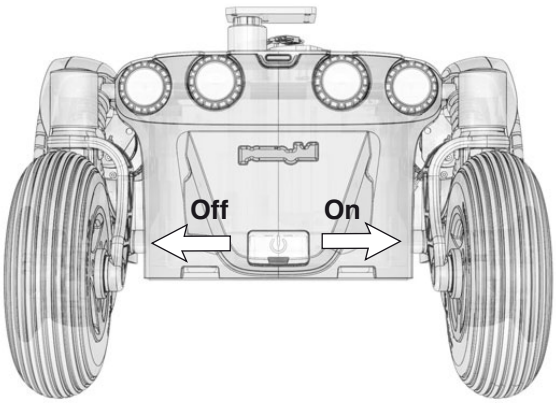
Resetting the main fuse

The main fuse also functions as a battery isolator but it is usually called the main fuse.

It is not normally necessary to replace the main fuse as it is automatic and can be reset when it has been triggered. The main fuse can be accessed through a recess in the rear chassis cover. It is reset by switching the switch to ON (see fig.).

⚠ CAUTION!

If the main fuse is triggered, there is often a major electrical fault. The cause of the fault should be checked carefully before the fuse is reset.



Main fuse/battery isolator (On/Off).

Removal

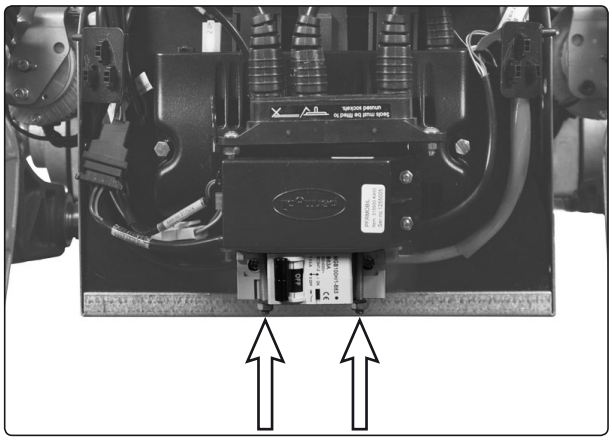
For this task the following tools are necessary:

1 Wrench 6 mm.
1 Phillips head screwdriver

1. Remove the chassis covers. See page 8-9.
2. Switch the main fuse to OFF (see fig. above).
3. Detach the negative cable from the rear battery.
4. Detach the positive cable from the front battery.
5. Remove the main fuse, which is held in place with two nuts (see fig. below).

⚠ CAUTION!

Fold the battery connection cables under so they cannot come into contact with the battery terminals.



On chassis with R-net Control System the Main Fuse is fitted with two nuts.

6. Disconnect the cables from the mail fuse by loosening the screws (see fig.).

⚠ CAUTION!

Note the direction in which the fuse is installed for subsequent fitting. The ON/OFF position must match the appropriate sticker on the chassis.

Main fuse cable connection.

Fuses

Assembly

Assemble in the reverse order.

1. Switch the new main fuse to OFF.
2. Connect the cables to the new main fuse.

For this task the following tools are necessary:

1 Wrench 6 mm.
1 Phillips head screwdriver

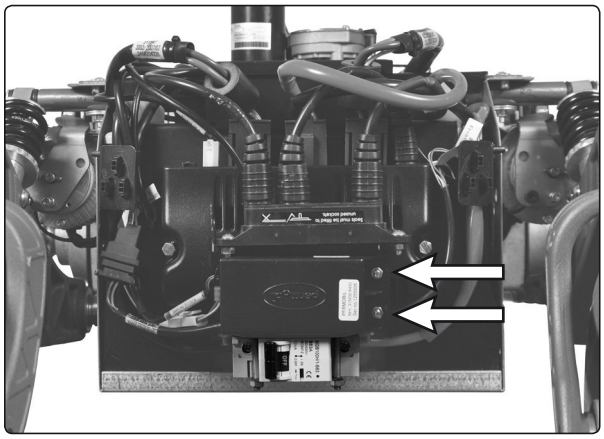
Main fuse cable connection.

⚠ CAUTION!

Note the direction in which the fuse is installed for subsequent fitting. The ON/OFF position must match the appropriate sticker on the chassis.

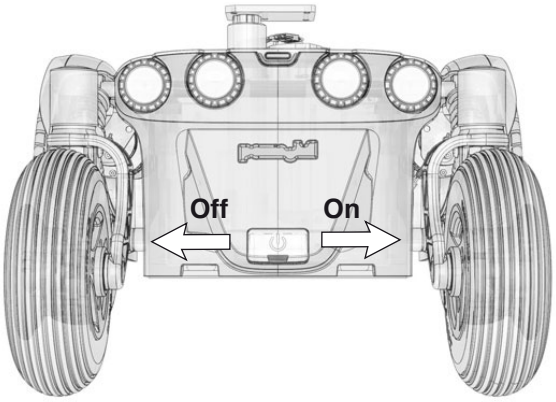
Check that the cables are firmly attached.

3. Fit the new main fuse on the bracket with the two nuts (see fig. below).
4. Reattach the battery connection cables to the batteries.
5. Fit the chassis covers. See page 8-9.



On chassis with R-net Control System the Main Fuse is fitted with two nuts.

6. Switch the main fuse to ON (see fig.).



Main fuse/battery isolator (On/Off).

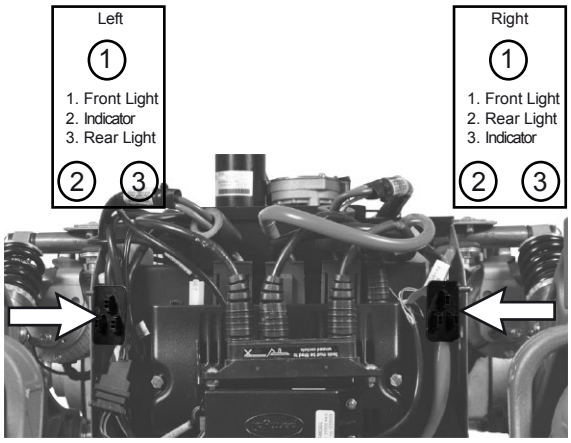
Lights (accessories)

Removing the front lights

For this task the following tools are necessary:

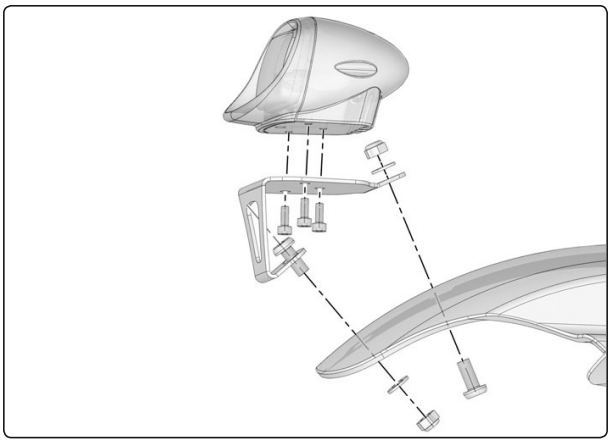
1 Torxnyckel TX20.
1 Insexnyckel 3 mm.

1. Switch off the main power switch on the control panel.
2. Remove the front and upper chassis covers. See page 8-9.
3. Disconnect the lights cable at the connections on the chassis. These are positioned on the left and right hand side of the power module. See fig.
4. Remove the cable from its cable brackets on the inside of the chassis cover. See fig. below.



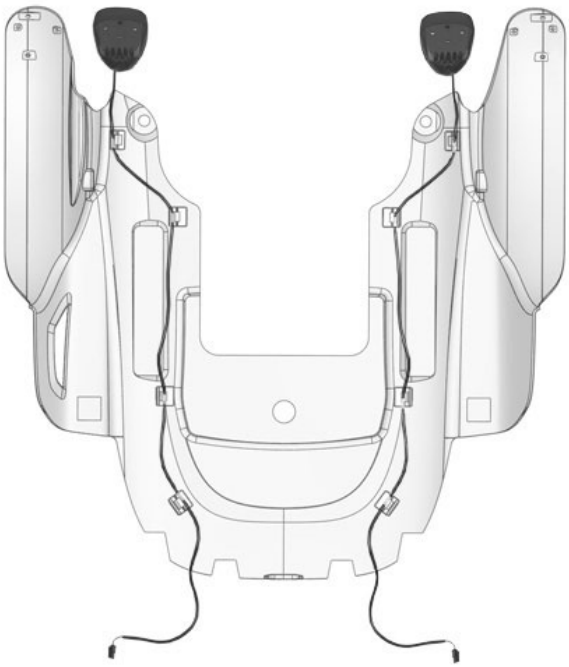
Light & Indicator connections.

5. Remove the light with bracket, it's mounted with two screws, nuts and washers. See fig.
6. Remove the bracket from the light, it's fitted with three screws. See fig.



The light with bracket is fitted to the chassis cover with two screws, nuts and washers.

The light is fitted to the bracket with three screws.



The cables are fitted with cable brackets on the inside of the chassis cover.

Lights (accessories)

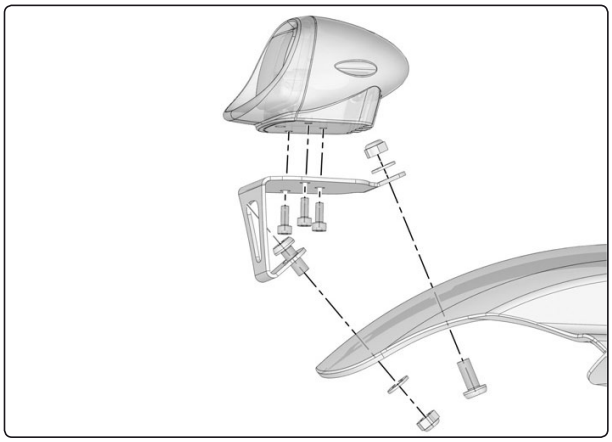
Assembly of front lights

Assemble in the reverse order.

1. Fit the light on its bracket using the three screws. See fig.
2. On chassis not equipped with holes for attachment of front lights, drill new holes using a Ø 4 mm. drill on the markings inside of the chassis covers. See fig. below.
3. Fit the front light with bracket on the chassis cover using the two screws, washers and nuts. See fig.
4. Fit the cables with the attached cabel brackets inside the chassis cover according to figure below.

For this task the following tools are necessary:

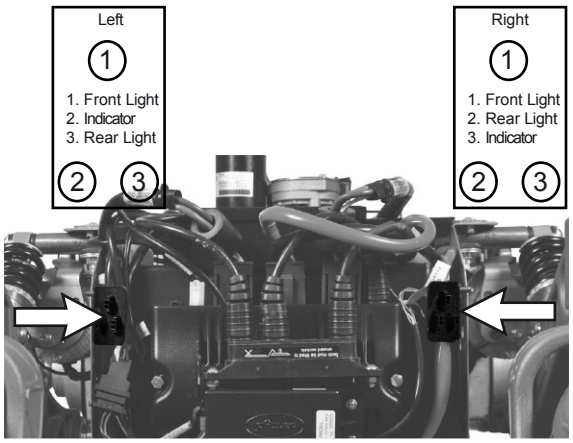
1 Torxnyckel TX20.
1 Insexnyckel 3 mm.



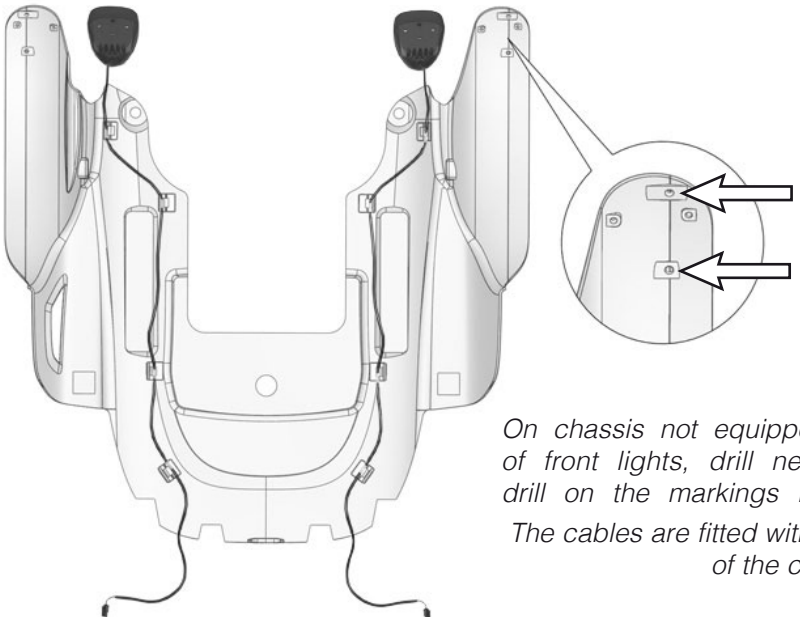
The light with bracket is fitted to the chassis cover with two screws, nuts and washers.

The light is fitted to the bracket with three screws.

5. Connect the front lights to the connectors on the chassis. These are positioned on the left and right hand side of the power module. See fig.
6. Refit the front and upper chassis covers. See page 8-9.



Light & Indicator connections.



On chassis not equipped with holes for attachment of front lights, drill new holes using a Ø 4 mm. drill on the markings inside of the chassis cover.

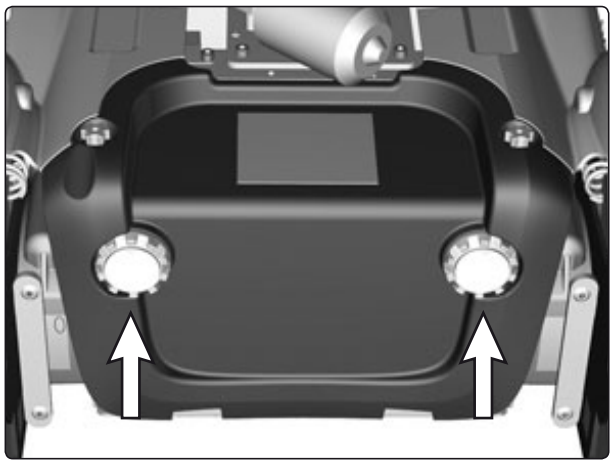
The cables are fitted with cable brackets on the inside of the chassis cover.

Lights (accessories)

Removing the front indicators

The front indicators are delivered complete with the chassis front cover.

1. Switch off the main power switch on the control panel.
2. Remove the front chassis cover. See page 8.
3. Disconnect the front indicators at the at the connections on the cabling. These are positioned on top of the front battery.



Front indicators.

Assembly of front indicators

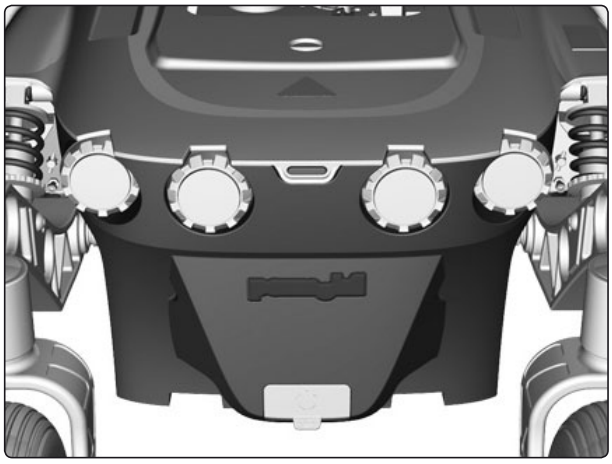
Assemble in the reverse order.

1. Connect the front indicators connections on the cabling. These are positioned on top of the front battery.
2. Refit the front chassis cover. See page 8.

Removing the rear lights and indicators

The rear lights and indicators are delivered complete with the chassis rear cover.

1. Switch off the main power switch on the control panel.
2. Remove the rear chassis cover. See page 8.



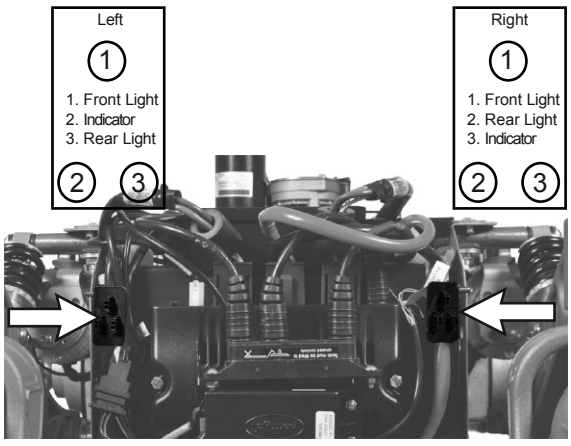
The rear cover is fitted with the upper chassis cover.

3. Disconnect the rear lights and indicator cables at the connections on the chassis. These are positioned on the left and right hand side of the power module. See fig.

Assembly of the rear lights and indicators

Assemble in the reverse order.

1. Connect the rear lights and indicator cables at the connections on the chassis. These are positioned on the left and right hand side of the power module. See fig.
2. Refit the rear chassis cover. See page 8.



Light & Indicator connections.

Control system

The wheelchair's control system can be programmed in order to optimize the performance of the wheelchair while also maintaining a high level of safety regardless of the wheelchair's other settings and equipment. The control system can also be programmed in order to make adjustments needed for a specific user. Standard parameter files can be downloaded from Permobil's website, *www.permobil.se*.

For more information on programming the **VR2** control system and obtaining parameter files, see the technical user manual for programming Pilot+ / VSI / VR2 (Art.no. 205009-SE-0).

For more information on programming/adjustment of the **Rnet** control system and obtaining parameter files, see the technical user manual for programming R-net. (Art.no. 205222-SE-0).

⚠ WARNING!

If the seat is raised above the standard position for wheelchairs equipped with a fixed seat tube, it is recommended that the wheelchair's control system be programmed so that the parameter for maximum forward speed is set to 75%. This particularly applies if the user's weight exceeds 100 kg.

Troubleshooting R-net

The following troubleshooting guide describes a number of faults and events which may occur when you use your wheelchair, together with suggested remedies. Note that this guide cannot describe all the problems and events which may occur and you should always contact your service contact or Permobil in case of doubt.

EVENT	POSSIBLE CAUSE	REMEDY
The wheelchair will not start	Batteries discharged.	Charge the batteries.
	The cable connection to the control panel has come loose.	Insert the cable in the control panel.
	Main fuse blown.	Check possible causes carefully before replacing the main fuse. See page 42.
The wheelchair cannot be driven.	Battery charger connected.	Stop charging and disconnect the charging cable from the wheelchair's charging socket.
	Brake release activated.	Reset the brake release.
	The wheelchair is locked.	Unlock the wheelchair. See user manual
An exclamation mark on the control panel display is flashing rapidly and the wheelchair will not run.	Electronics fault.	See pages 49–62.
The wheelchair can only be driven at reduced speed.	Seat lift raised too high.	Lower seat lift.
The wheelchair cannot be charged.	Main fuse blown.	Check possible causes carefully before replacing the main fuse. See page 42.
The wheelchair "switches itself off" after a certain period of inactivity.	The electronics' energy-saving mode has been activated.	Switch the wheelchair on again using the start key on the control panel.

Troubleshooting R-net

Rnet diagnostics

When an error or a fault occurs in the wheelchair's electronics, information on it is displayed in the control panel's display. This information can then be used to diagnose where the error/fault occurred and its cause.

Troubleshooting and repairs must always be performed by competent personnel with good knowledge of the wheelchair's electronics. More information on troubleshooting and remedies can be found in the service manual for this wheelchair model.

Diagnostic screens

Current diagnostic screen

When the control system's integrated protection circuits have been triggered so that the control system can no longer operate the wheelchair, a diagnostic screen is displayed in the control panel's display.

This indicates a system fault, i.e. Rnet has detected a problem somewhere in the wheelchair's electric-al system.

NB! *If the fault is in a module that is not currently being used, it will still be possible to drive the wheelchair, but the diagnostic screen is displayed occasionally.*

Switch off the wheelchair and leave it off for a few minutes. Then restart the wheelchair. If the fault persists, you must switch off the wheelchair and get in touch with your service contact. Write down the information displayed in plain text in the control panel's display and pass it on to your service contact.

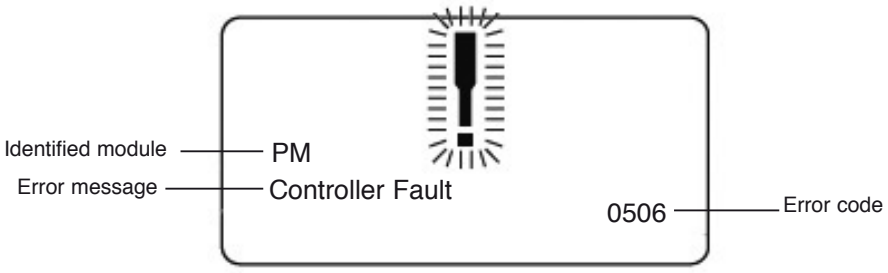
Do not use the wheelchair until the problem has been remedied or you have received other instructions from your service contact.

⚠ WARNING!

Diagnostics should only be performed by persons with sound knowledge of the wheelchair's electronic control system. Incorrect or poorly performed repair works may make it dangerous to use the wheelchair. Permobil accepts no liability for any personal injury or damage to the wheelchair and its surroundings that occurs on account of incorrect or poorly performed repair work.

Troubleshooting R-net

Example of a screen showing a system fault



Identified module
This indicates the control system module that detected the problem.

PM= Power module
JSM= Joystick module

Error message
The error message provides a brief description of the error type.

Error code
The four-digit code indicates which protection circuit has been triggered.

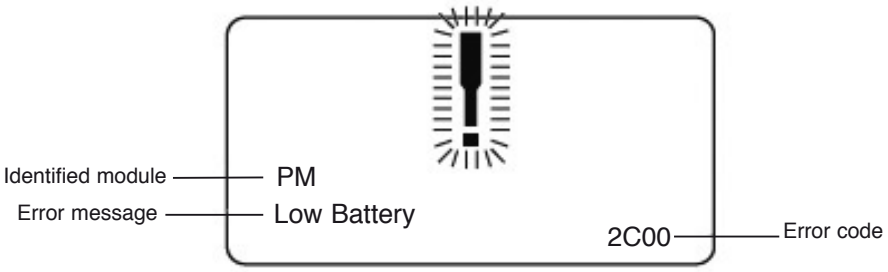
2.1.4 Example

The screen example shown below displays the following information:

Identified module: Power module error
Error message: Low Battery
Error code: 2C00

This means that the battery needs charging or that the battery has not been connected properly.

- *Check the battery connections. Attempt to charge the battery if it is properly connected.*



Troubleshooting R-net

2.2 System log

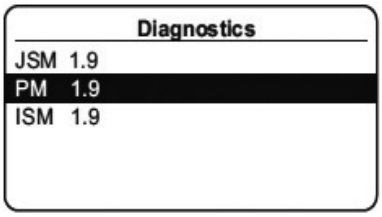
All errors are saved in the system log regardless of whether they have been remedied or are still active. The system log saves the error messages and the number of times they arise. The errors are saved in their respective modules within the system.

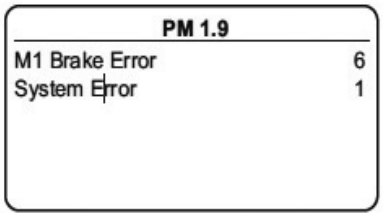
The system log is accessed by means of programming directly in the system (On Board Programming, OBP).

Contact Permobil or your repair engineer for more information on OBP.

Go to OBP mode

- *Select System from the menu.*
- *Select Diagnostics from the menu.*
- *The diagnostics screen will now appear, showing the connected modules and version history. See the illustration below.*
- *If a module has experienced no errors, the message No Entries will be displayed, otherwise something similar to the screenshot below will be displayed.*





Troubleshooting R-net

3. Definitions of diagnostics messages

When an error message has been displayed and the defective module has been identified, you can use the following definitions to determine the possible cause of the error and what remedial action is required to correct it.

Error message	Description
Joystick Error	Go to section 3.1.
Low Battery	Go to section 3.2.
High Battery	Go to section 3.3.
M1 Brake Error	Go to section 3.4.
M2 Brake Error	Go to section 3.4.
M1 Motor Error	Go to section 3.5.
M2 Motor Error	Go to section 3.5.
Inhibit Active	Go to section 3.6.
Jstick Cal Error	Go to section 3.7.
Latched Timeout	Go to section 3.8.
Brake Lamp Short	Go to section 3.9.
Left Lamp Short	Go to section 3.10.
Right Lamp Short	Go to section 3.10.
L Ind Lamp Short	Go to section 3.11.
R Ind Lamp Short	Go to section 3.11.
L Ind Lamp Failed	Go to section 3.12.
R Ind Lamp Failed	Go to section 3.12.
DIME Error	Go to section 3.16.
Memory Error	Go to section 3.17.
PM Memory Error	Go to section 3.18.
Bad Cable	Go to section 3.19.
Bad Settings	Go to section 3.20.
Module Error	Go to section 3.21.
System Error	Go to section 3.22.
Gone to Sleep	Go to section 3.23.
Charging	Go to section 3.24.

Troubleshooting R-net

3.1 Joystick Error

The commonest cause for this error is that the joystick was moved away from its central position before and during the time at which the control system was switched on. The screen for a shifted joystick is displayed for 5 seconds. If the joystick is not released during this time, a joystick error is registered. Even if an error screen is not displayed, the error and the number times it arises is registered in the system log.

- *Ensure that the joystick is in the central position and start up the control system.*

If the error persists, the joystick or joystick module may be defective. Read more in section 5.

3.2 Low Battery

This occurs when the control system detects that the battery voltage is lower than 16 V.

- *Check the batteries and their connection to the control system.*

If the error persists after the batteries and connections have been checked, the power module may be defective. Read more in section 5.

3.3 High Battery

This occurs when the control system detects that the battery voltage is higher than 35 V. The commonest causes for this error are that the battery has been overcharged or a poor connection between the control system and the batteries.

- *Check the batteries and their connection to the control system.*

If the error persists after the batteries and connections have been checked, the power module may be defective. Read more in section 5.

3.4 Brake Error

This occurs when the control system detects a problem in the solenoid brakes or the connections to them.

1505 - M1 Brake Error
1506 - M2 Brake Error

- *Check the solenoid brakes, their cables and the connections to the control system.*

If the error persists after the checks listed above, the power module may be defective. Read more in section 5.

3.5 Motor Error

This occurs when the control system detects that a motor has been disconnected.

3B00 - M1 Motor Error
3C00 - M2 Motor Error

- *Check the motors, their cables and the connections to the control system.*

If the error persists after the checks listed above, the power module may be defective. Read more in section 5.

3.6 Inhibit Active

This occurs when one of the inhibit signals is active and is in blocked mode.

The last two digits of the error code indicate the active inhibit signal. The code is hexadecimal.

1E01 - For inhibit signal 1.
1E09 - For inhibit signal 9.
1E0A - For inhibit signal 10.

- *Cycle the voltage. This will deactivate the block mode, which may remedy the error.*
- *Check all connections and switches for the indicated inhibit signals.*

Troubleshooting R-net

3.7 Joystick Calibration Error

This occurs when joystick calibration has been unsuccessful.

- *Go to OBP mode and recalibrate.*

If the error persists, the joystick module may be defective. Read more in section 5.

3.8 Latched Timeout

This occurs when the control system detects that the programmed block time has been exceeded. This can, for example, be due to the signal units (joystick, main steering device, suction and blowing device, etc.) not having been used frequently enough.

The error reference provides information on why the control system has left block mode.

- *Cycle the voltage.*
- *Activate block mode.*

If the error persists after the checks listed above, the signal unit may be defective. Read more in section 5.

3.9 Brake Lamp Short

This occurs when the control system detects a short circuit in the brake lamp electrical circuit. Read more about connectors in section 2.3.

- *Check the brake lamps, their cables and the connections to the control system.*

3.10 Lamp Short

This occurs when the control system detects a short circuit in the electrical circuit of one of the lamps.

7205 - Short circuit left-hand lamp.
7209 - Short circuit right-hand lamp

- *Check the lamps, their cables and the connections to the control system.*

3.11 Indicator Lamp Short

This occurs when the control system detects a short circuit in the electrical circuit of one of the indicators.

7206 - Short circuit left indicator.
720A - Short circuit right indicator.

- *Check the indicators, their cables and the connections to the control system.*

3,12 Indicator Lamp Failed

This occurs when the control system detects an error in the electrical circuit of one of the indicators. This usually means the indicator needs replacing.

7207 - Error in left indicator.
7208 - Error in right indicator.

- *Check the indicators, their cables and the connections to the control system.*

Troubleshooting R-net

3.16 DIME Error

This occurs when the control system detects an ID conflict between two modules in the system.

If a new module has been added:

- *Disconnect the new module and cycle the voltage.*
- *If no error occurs, connect the new module to the system and cycle the voltage.*
- *If the error recurs, the new module must be the cause of the problem.*

If no new modules have been added:

- *Disconnect one module at a time and cycle the voltage.*

If the error persists after the checks listed above have been performed, consult your service contact or Permobil.

3.17 Memory Error

This is a non-specific memory error that may be caused by any of the system modules.

- *Check all cables and connections.*
- *Cycle the voltage.*

If the error persists and the system includes third-party modules:

- *Disconnect all modules that do not come from PGDT and cycle the voltage.*

If this has dealt with the error:

- *Connect one third-party module at a time and cycle the voltage each time.*
- *If the error recurs after one of the voltage cycles, the last module to be connected must be defective.*

If the error persists after the checks listed above, the power module may be defective. Read more in section 5.

3.18 PM Memory Error

This is a specific error in the power module.

- *Check all cables and connections.*
- *Reprogram the control system with the help of R-net's PC programmers.*

This should be done with either the latest specific program file for the wheelchair or Permobil's original program file.

If the error persists after the checks listed above, the power unit may be defective. Read more in section 5.

⚠ CAUTION!

Programming should only be performed by persons with sound knowledge of control systems from PGDT. Incorrect programming can mean that the wheelchair is not safe to use. Permobil cannot be held responsible for losses of any kind if the control system factory settings are altered by programming.

Troubleshooting R-net

3.19 Bad Cable

This occurs when the control system detects a connection error in the communication cables between the modules.

- *Check all cables and connections to ensure there is no stoppage.*
- *Replace any cables with visible damage. Then cycle the voltage.*
- *Disconnect one cable at a time from the system and cycle the voltage after each disconnection.*

If the error persists after the checks listed above, the power unit may be defective. Read more in section 5.

3.20 Bad Settings

This occurs when the control system detects incorrect or invalid program settings.

- *Check all parameter settings and then reprogram the control system with the help of R-net's PC programmers.*
- *Make a note of the current parameter settings and then reset the control system to the standard settings.*
- *Reprogram the required settings in small groups and cycle the voltage after each group to see if the error recurs.*

If the error persists after the checks listed above, the power unit may be defective. Read more in section 5.

3.21 Module Error

This occurs when the control system detects an error in a specific module. The module is displayed on the diagnostics screen according to the description in section 2.

- *Check all cables and connections.*
- *Cycle the voltage.*

If the error persists after the checks listed above, the module specified may be defective. Read more in section 5.

Troubleshooting R-net

3.22 System Error

This occurs when the control system detects an error that cannot be ascribed to a specific module.

- *Check all cables and connections.*
- *Cycle the voltage.*

If the error persists and the system includes third-party modules:

- Disconnect all modules that do not come from PGDT and cycle the voltage.

If this has dealt with the error:

- *Connect one third-party module at a time and cycle the voltage each time.*
- *If the error recurs after one of the voltage cycles, the last module to be connected must be defective.*

If the error persists after the checks listed above, the system from PGDT may be defective. Read more in section 5.

3.23 Gone to Sleep (energy saving mode)

This occurs when the system has not been used for a period that exceeds the Sleep Timer parameter used for setting the energy saving mode. Each time this occurs it is registered in the system log.

3.24 Charging

This occurs when the control system detects that a charger has been connected to either inhibit contact 1 or inhibit contact 3. Read more about connectors in section 2.3.

The screen for battery charging is displayed when a charger is connected.

Each time this occurs it is registered in the system log.

When using an integral charger:

- *Disconnect the charger from the mains.*

When using an external charger:

- *Disconnect the charger from the power wheelchair.*

If the error persists after the charger has been disconnected, the joystick module may be defective. Read more in section 5.

Troubleshooting R-net

4. Basic test

After a repair has been completed, the following test should be performed. These are minimum recommendations. Depending on what the original error source was, further tests may be necessary.

⚠ WARNING!

The tests described are minimum recommendations. It is the responsibility of the repair engineer(s) to perform other tests on the basis of the original error source and the wheelchair model. The necessary information on other tests is available in the wheelchair service manual. Permobil cannot be held responsible for losses of any kind that may arise when these tests are conducted, or that arise as a consequence of further relevant tests not being conducted.

⚠ WARNING!

These tests should be conducted in an open space, and some kind of clamping device, such as a safety belt, should always be used. Permobil cannot be held responsible for losses for any kind arising due to these recommendations not being observed.

4.1 Basic inspection

Check that all contacts are properly connected.

- *Check all cables and contacts to ensure there is no visible damage.*
- *Check that the rubber gaiter around the base of the joystick is not damaged. Inspect the gaiter visually. It should not be subjected to manual handling.*
- *Ensure that all components of the control system are securely installed.*
- *Do not over-tighten the mounting screws.*

Troubleshooting R-net

4.2 Brake test

These tests should be carried out on an even surface with at least one meter of free space around the wheelchair.

- *Switch on the control system.*
- *Check that the screen remains on after start-up.*
- *Bring the joystick slowly forwards until you hear the parking brakes functioning. In some cases the wheelchair may begin to move.*
- *Release the joystick immediately. You must hear both parking brakes functioning within 2 seconds.*
- *Repeat the test three times, bringing the joystick slowly backwards, to the left and to the right.*

4.3 Test run

Set the highest permitted speed to the lowest value and run the wheelchair in all directions while checking that it runs smoothly and is easy to maneuver.

Repeat the test with the speed control set to the highest possible value.

4.4 Gradient test

⚠ WARNING!

When this test is conducted, an additional person must be present in order to prevent the wheelchair tipping over backwards.

Run the wheelchair forwards up its steepest permitted gradient. Release the joystick when the wheelchair is on the upward slope and check that the wheelchair stops and that the brakes function as they should without the front wheels lifting from the ground.

Bring the joystick forwards and continue to run up the slope. Check that the wheelchair moves gently forwards.

Stop the wheelchair and reverse down the slope. Release the joystick when the wheelchair is on the upward slope and check that the wheelchair stops and that the brakes function as they should without the front wheels lifting from the ground.

Troubleshooting R-net

4.5 Test of lights, indicators and warning lights

If the wheelchair is equipped with lights:

- *Check that all bulbs light up as they should.*
- *Check that all bulbs light up as they should and that the flashing frequency is 1.5 Hz ± 0.5 Hz.*
- *Remove the bulbs in turn and check that the remaining bulb on the same side flashes at a requency of 3 Hz ± 0.5 Hz.*

If the wheelchair is equipped with warning lights:

- *Check that all bulbs light up as they should and that the flashing frequency is 1.5 Hz ± 0.5 Hz.*

4.6 Test of adjustment device

If the wheelchair is equipped with an adjustment device:

- *Check that all motors move in the right direction.*
- *Make sure that the mechanical end stops are secured and that they stop the adjustment device motors, and thus use the automatic end stop tracking that is in the seat and light module (ISM).*

4.7 Test of inhibit signal

Connect a suitable battery charger or equivalent inhibit connecting device in the charging contact on the joystick module and check that the wheelchair is prevented from running.

If inhibit contacts 2, 3, 4 and 5 are used for inhibiting or speed restriction, an appropriate test should be performed in order to check that they are functioning as they should.

5. Repairing defective units

Apart from specific OEM-approved spare parts (contact Permobil for further information on these), there are no replaceable parts in the Rnet control system. Consequently, defective units must be sent to Permobil or a Permobil-approved repairer for repair.

⚠ CAUTION!

If any part is replaced without Permobil's approval, the control system's warranty lapses.

⚠ CAUTION!

Permobil cannot be held responsible for losses of any kind arising as a result of a component of the Rnet control system being opened, adjusted or modified without permission.

Troubleshooting R-net

Rnet diagnostics

When an error or a fault occurs in the wheelchair's electronics, information on it is displayed in the control panel's display. This information can then be used to diagnose where the error/fault occurred and its cause.

Troubleshooting and repairs must always be performed by competent personnel with good knowledge of the wheelchair's electronics. More information on troubleshooting and remedies can be found in the service manual for this wheelchair model.

Diagnostic screens

Current diagnostic screen

When the control system's integrated protection circuits have been triggered so that the control system can no longer operate the wheelchair, a diagnostic screen is displayed in the control panel's display.

This indicates a system fault, i.e. Rnet has detected a problem somewhere in the wheelchair's electrical system.

NB! *If the fault is in a module that is not currently being used, it may still be possible to drive the wheelchair, but the diagnostic screen is displayed occasionally.*

Switch off the wheelchair and leave it off for a few minutes. Then restart the wheelchair. If the fault persists, you must switch off the wheelchair and get in touch with your service contact. Write down the information displayed in plain text in the control panel's display and pass it on to your service contact.

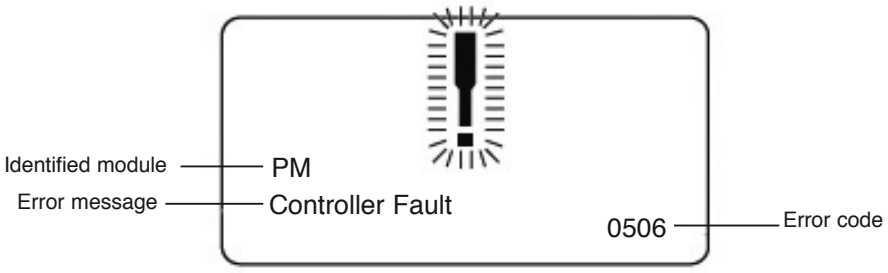
Do not use the wheelchair until the problem has been remedied or you have received other instructions from your service contact.

⚠ WARNING!

Diagnostics should only be performed by persons with sound knowledge of the wheelchair's electronic control system. Incorrect or poorly performed repair works may make it dangerous to use the wheelchair. Permobil cannot be held responsible for any personal injury or damage to the wheelchair and its surroundings that occurs on account of incorrect or poorly performed repair work.

Troubleshooting R-net

Example of a screen showing a system fault



Identified module
This indicates the control system module that detected the problem.

PM= Power module
JSM= Joystick module

Error message
The error message provides a brief description of the error type.

Error code
The four-digit code indicates which protection circuit has been triggered.

Repair of defective units

Apart from specific OEM-approved spare parts (contact Permobil for further information on these), there are no replaceable parts in the Rnet control system. Consequently, defective units must be sent to Permobil or a Permobil-approved repairer for repair.

⚠ CAUTION!

If any part is replaced without Permobil's approval, the wheelchair's warranty lapses. Permobil cannot be held responsible for losses of any kind arising as a result of a component of the Rnet control system being opened, adjusted or modified without permission.

Troubleshooting VR2

The following troubleshooting guide describes a number of faults and events which may occur when you use your wheelchair, together with suggested remedies. Note that this guide cannot describe all the problems and events which may occur and you should always contact your service contact or Permobil in case of doubt.

EVENT	POSSIBLE CAUSE	REMEDY
The wheelchair will not start.	Batteries discharged.	Charge the batteries.
	The cable connection to the control panel has come loose.	Insert the cable in the control panel.
	Main fuse blown.	Check possible causes carefully before replacing the main fuse. See page 42.
The wheelchair cannot be driven.	Battery charger connected.	Stop charging and disconnect the charging cable from the wheelchair's charging socket.
	Brake release activated.	Reset the brake release.
	The wheelchair is locked.	Unlock the wheelchair. See user manual.
The battery voltage indicator on the control panel is flashing rapidly and the wheelchair will not run.	Electronics fault.	See pages 64–65.
The wheelchair stops while being driven.	The cable connection to the control panel has come loose	Insert the cable in the control panel.
The wheelchair can only be driven at reduced speed.	Seat lift raised too high.	Lower seat lift.
The wheelchair cannot be charged.	Main fuse blown.	Check possible causes carefully before replacing the charging fuse. See page 42.
The wheelchair "switches itself off" after a certain period of inactivity.	The electronics' energy-saving mode has been activated.	Switch the wheelchair on again using the start key on the control panel.

Troubleshooting VR2

VR2 electronics diagnostics

Battery voltage indicator
Each time the wheelchair is started, parts of the wheelchair's electronics are checked. If any fault has occurred in these parts, this is displayed on the control panel's battery voltage indicator and the indicator for speed/driving profile in the form of one or more flashing lamps.

Troubleshooting and repairs must always be performed by competent personnel with good knowledge of the wheelchair's electronics. More information on troubleshooting and remedies can be found in the service manual for this wheelchair model.

Permanently on
Everything is in order. The number of lamps that light up depends on the voltage remaining in the batteries. If the batteries are fully charged, all the lamps light up.

Slowly flashing red lamps, 1 - 2
The batteries need to be charged immediately.

Flashing fast, 1 - 10 lamps
A fault has been detected in the wheelchair's electronics and the wheelchair cannot be driven.

- Switch off the wheelchair.
- Check that all visible cables and the cable to the control panel are connected correctly.

Switch the wheelchair on again. If the fault persists, count the number of flashing lamps and check for a possible cause and remedy in the table on the adjoining page.

Do not use the wheelchair until the problem has been remedied or you have received other instructions from your service contact.

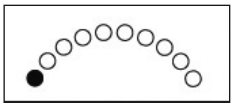
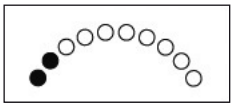
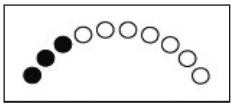
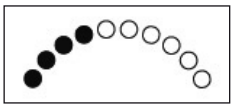
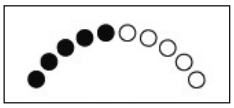
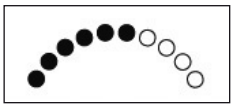
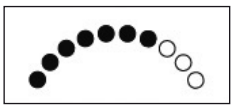
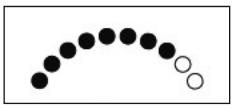
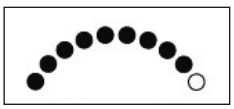
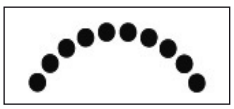
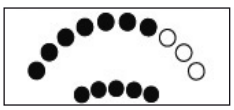
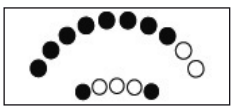
⚠ WARNING!

Diagnostics should only be performed by persons with sound knowledge of the wheelchair's electronic control system. Incorrect or poorly performed repair works may make it dangerous to use the wheelchair. Permobil cannot be held responsible for any personal injury or damage to the wheelchair and its surroundings that occurs on account of incorrect or poorly performed repair work.

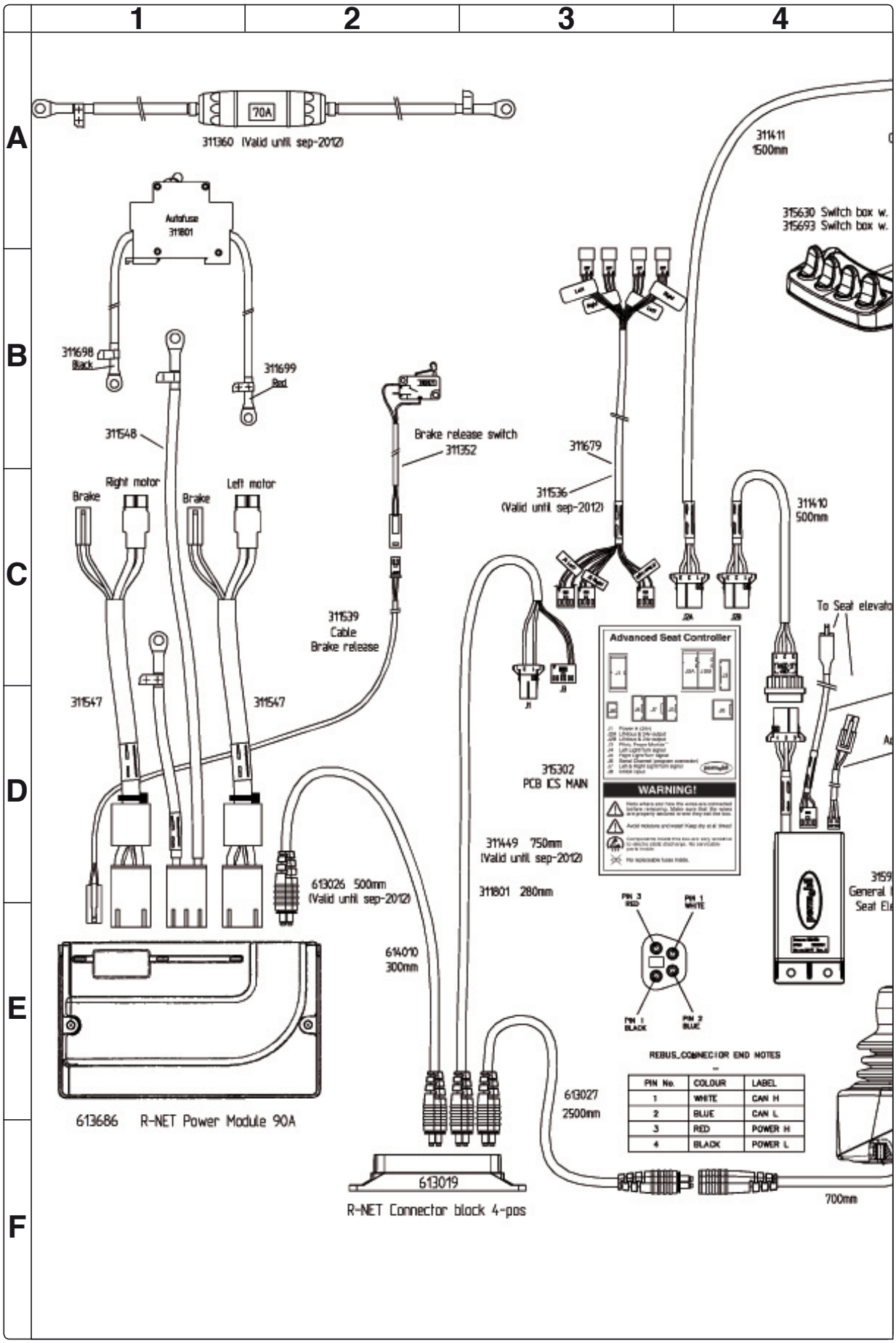
⚠ CAUTION!

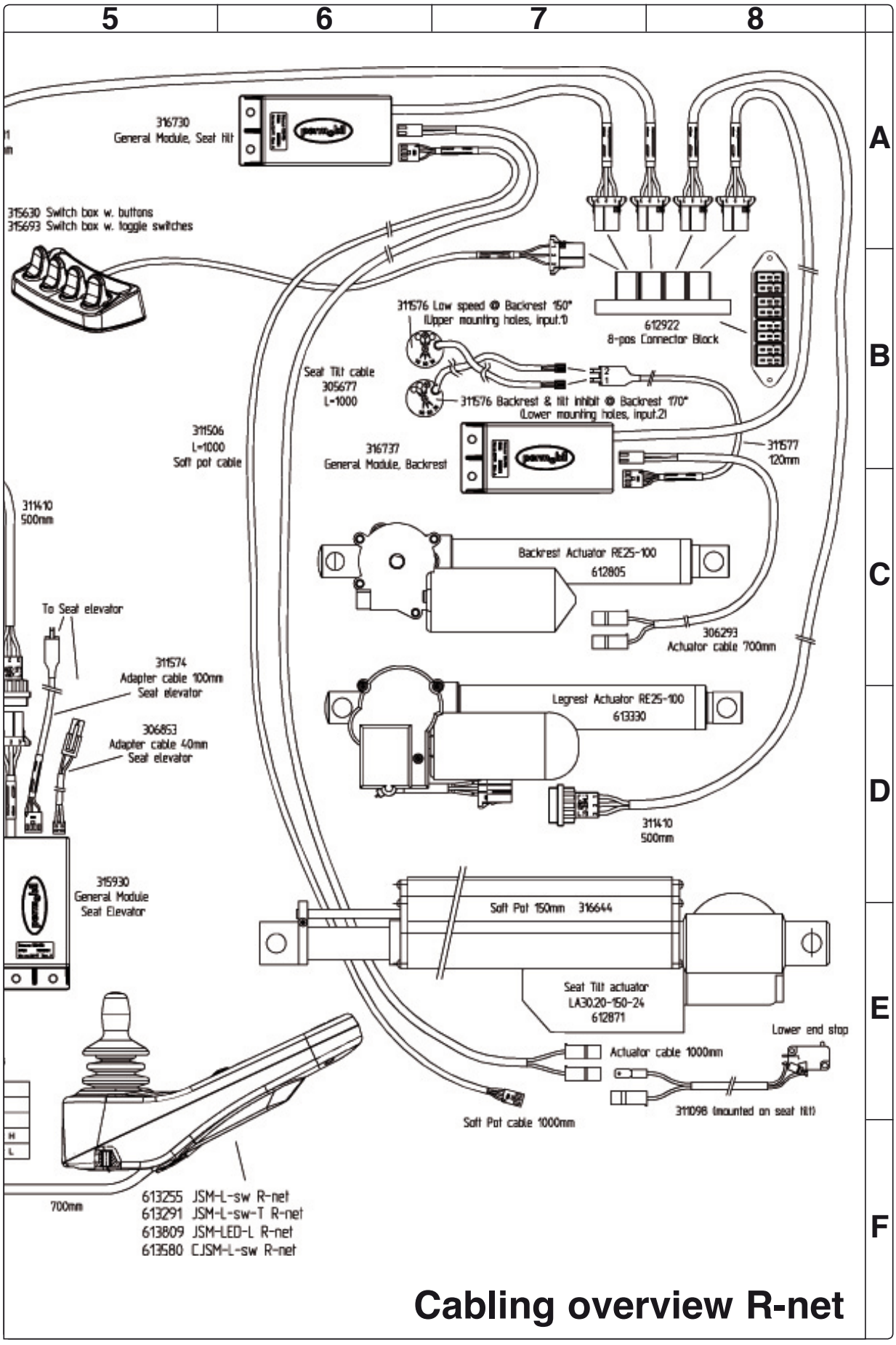
Any error signals on the indicators are not displayed while the wheelchair is being driven. They appear when it is next started.

Troubleshooting VR2

ERROR SIGNAL	ERROR INDICATION - REMEDY
	**1 Lamp - Low battery voltage** Check the condition of the battery. Check the contact between the battery and the control unit.
	**2 Lamps - Failure in left drive motor** Check the connection to the left drive motor.
	**3 Lamps - Short-circuit in left drive motor** Check the drive motor's contacts and cables.
	**4 Lamps - Failure in right drive motor** Check the connection to the right drive motor.
	**5 Lamps - Short-circuit in right drive motor** Check the drive motor's contacts and cables.
	**6 Lamps - Battery charger connected** Disconnect the battery charger.
	**7 Lamps - Joystick error** Check that the joystick has not been moved when the wheelchair is started
	**8 Lamps - Control system error** Check the contacts to the output stage.
	**9 Lamps - Failure in brake circuit** Check the contacts to the magnetic brake.
	**10 Lamps - High battery voltage** Check the battery and the contacts between the battery and the control unit.
	**7+5 Lamps - Communication error** A communication error has been indicated. Check that the cable to the control panel is not damaged and is correctly inserted.
	**8+2 Lamps - Adjustment device error** An adjustment device error has been indicated. If the wheelchair is fitted with more than one adjustment device, check which one is not working. Check the adjustment device cable connections.

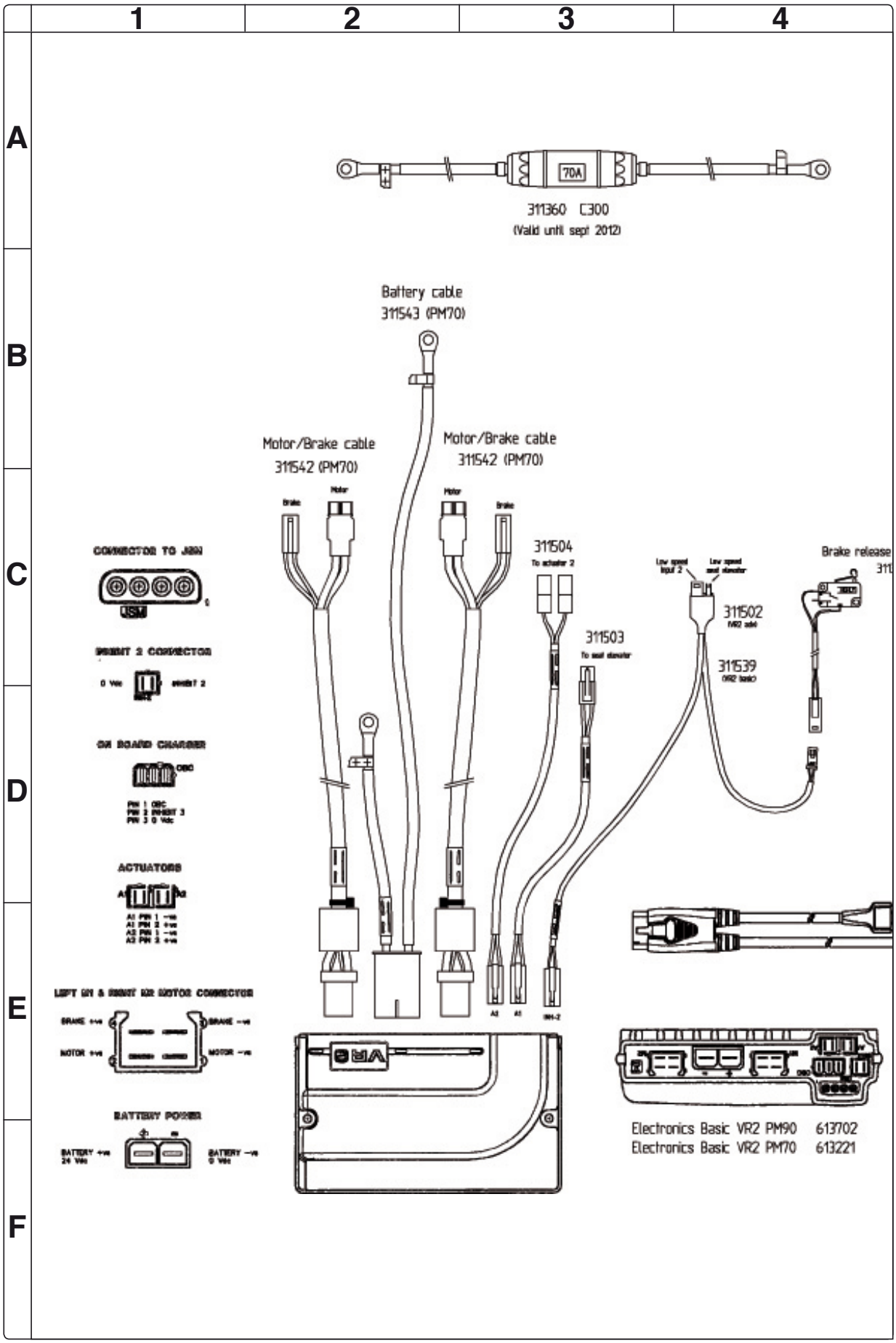
Cabling overview

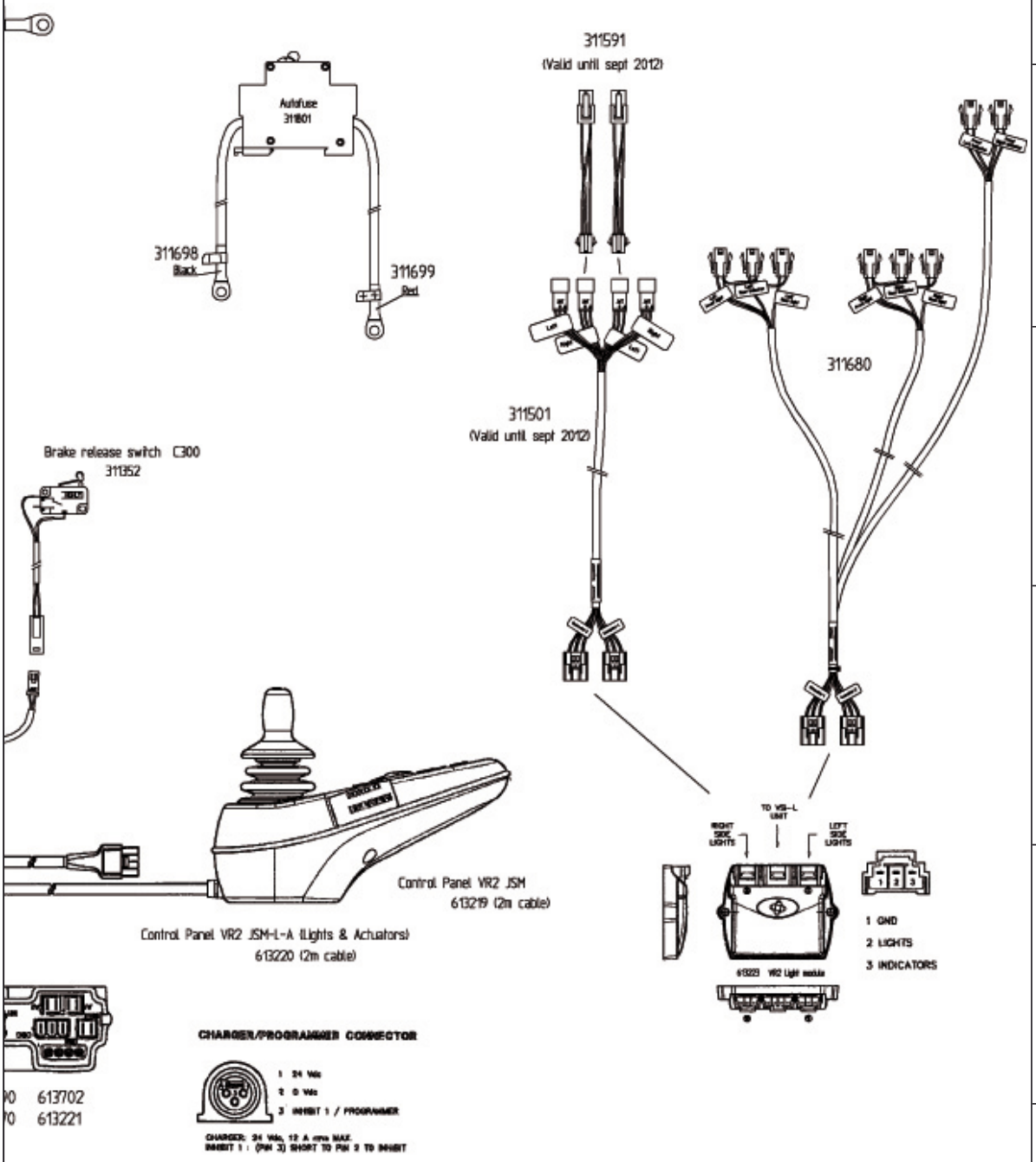




Cabling overview R-net

Cabling overview





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